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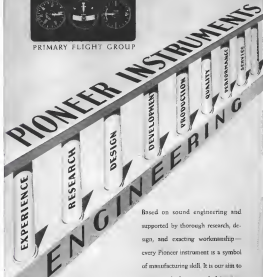


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Gabel, H. H. Weiss, Dudley Starke, and many others. More than 250 persons, representing some 20 organizations, attended.

JOEY LEBRON, Area Insurance Underwriter, CLEVELAND, speaks most of his time dabbling rather than you about the country in the interest of aviation safety. In between trips he finds time to get out an occasional News Letter full of interesting little comments and ideas. In a recent one he reported an entry in a pilot's logbook which is perhaps the height of something or other. A motor failure on take-off had led him back onto the airport, but his ship rolled over a ditch and fell into a clump of trees. Fortunately nobody was hurt, but the plane was a complete washout. The big story: "Trip cancelled account of sudden stop."

ALTHOUGH THE AMERICAN AIRWAY TRADING DIVISION HAS FORMED BY SOME EXTRA MAIL AND TRAVELERS SEVERAL ON BOARD of the West Coast docked enroute, it nevertheless welcomed the end of the 90 day shipping season. During the strike their meteorological boys had been recently handicapped in clearing Pacific Coast weather conditions, for there were less than half the usual number of stations in the Pacific coast-Hawaii area. In French weather reports. As soon as some of the weather boys were a complete blank, and several flights had to be postponed until weather reports were available. During December and early January, however, considerable help came from the Navy which had stationed vessels at 200-mile intervals between San Diego and Hawaii to collect weather data in advance of the formidable flight of the reds. Consolidated parcel boxes late in January.

RESIDENTS OF KANSAS CITY and other parts in the Midwest should be treated to some something spectacular when Ben Gregory (of War-daw Airport) gets his flying power plant under way. According to reports, he is running a Ford Tri-motor with more than 30 individual spark-plugs, requiring in power from 250 to 3,000 watts each, for a total of approximately 50,000,000 candlepower. To provide the current a 22 hp. gasoline engine drives, 125 kw. generator has been installed in the ship to



SECOND BREAKERS

Leslie Thelen recently pushed his Whitehead-Randolph in a new record when she made the 125 miles between Detroit and Akron in 49 min. 45 sec. Ray Brown of General Electric service record holder with his Lockheed Vega "Miss Thunder," broke her record.

gether with the necessary control panels. Output, of course, is for advertising and publicity by a national advertiser (insurance). Unusual lighting effects are expected from carrying the beams of the various searchlights in various colors onto clouds of smoke emitted by the airplane. The lighting display is to be held at an aviation-garden. The real business is in those related to large new signs carried on the under surface of each wing. We know pretty well how power requirements are going up on aircraft but it will be a long

time before any of our flying boats will need this "power" required by Ben's flying searchlights.

AN AIR RESEARCHER, AIRCRAFTS ON NAME (see JOURNAL AVIATION) a military staff. We are proud to welcome Keith Hensley as radio editor. Keith has been in the radio business since 1922 and is publishing since 1925. In general he is editor of "Aviation" in the United States for his radio books, the most recent of which is "Electronic News in Industry." Others include "Psychology of Radio" and "Radio Engineering Handbook."

ACCORDING TO THE AMERICAN'S new NEWS LETTER, one of their ships was recently grounded in mid-air by a time hole. Sounds like a "hole" it or not—but it actually happened in Pilot John Cason going out of Vera Cruz, Sonora. Some day he passed under a flock of frigate birds at some 2,250 ft. when the ship came through the windshield, landed perfectly in his lap. Luckily one of the lug bolts was so sturdy by the plane's approach that he lost his finger.





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Side Slips



By
**ROBERT
OSBORN**

MR. E.A.S. of New York writes me to explain that the Bureau of Air Commerce appears to be among pilot's heroes to persons who are too young, and he thinks that a recent accident may have been caused by the pilot trying to fly with a belly-pop in one hand. He quotes from the New York Times:

"As the plane raced across the field, the second plane, in open place, piloted by William O'Connell, 4, of 4215 Conroy Avenue, Brooklyn, headed and tumbled toward



out of the hangar. The two planes met almost head-on in the center of the field and the impact of both was heard. Both craft were wrecked."

As you can see, this is the evidence used in the program with which the latest developments of the aircraft are adapted to practice on an advisory. For instance, only two days after Professor Jean Proust stated that in his next stratosphere

flight he would make use of two thousand new-type small balloons for lifting instead of a single large balloon, Sally Rand announced that she would use the same type of balloons in her bubble dance.

A United Press man-on-the-spot describing some experiments in sub-atmosphere flying by TWA pilots and engineers stated: "The men flew from Kansas City to Dayton at 250 miles an hour at an altitude of 30,000 feet and in temperatures as low as 50 degrees below zero. They were forced to use special oxygen feeding equipment in breathe. On landing the men said they experienced great hunger."

Having successfully fought for the dinner checks of many pilots in the last three years, we are much amused by the fact that they "experienced great hunger" should have been considered a noteworthy item.

It is interesting to observe arrangements for additional armaments and larger Army, Navy, and Air Force a foreign government announced, "Our policy is to guard and maintain prosperity and to have our fundamental policies proposed throughout the world to promote the happiness of mankind."

As similar statements of policy are also issued by all other large nations from time to time, we should like to make a suggestion: Call the attention of each nation to the fact that all other nations are happy, by their own statements, and therefore it will not be necessary to impose happiness on the rest of the world by force of arms.

The one suggestion that "Daisy fields look green" is not exactly applicable, but once similar thought comes to mind with the news that United Air Lines is now running a "snow plane" from New York to Idaho for winter sports enthusiasts. What a fortunate thing for all lovers of transportation that the human being has an overwhelming desire to be somewhere else!

"TRANSPORT CRASH RULED ACCIDENTAL" Headline in Philadelphia Record

Well, we're glad to have that much of a serious problem solved and out of the way.

San Jose, Cal., Feb. 5 (UP)—The Army Douglas VC-124 crashed in a forest near an old hangar here today after continuing aloft for more than twenty-five hours awaiting a



fell in the window which swept the countryside below."

Was it too windy for the landing crew remaining here to move their whole lot, top hats and tails?

For this story that is quite a while. The largest number was in to replenish his supply of cups and to comment that he saw in the papers where someone had invented an airplane which could be piloted by the first like a bicycle, and he didn't think much of the idea on account of the water reason he had taken up flying and that the pilot was able to get around with very little effort on his part.



Last minute preparations. The luggage goes aboard an airliner before departure.



By S. Paul Johnston
Editor of Aviation

We Lead the Way

America is justly proud of her commercial air transport. None other of her industries has made such brilliant progress in so short a time. No other has ever attracted to it such a distinguished clientele,—one drawn into its ranks such enthusiasm and outstandingly competent talent. Certainly none has any more promising future.

Air transport in America is still very young. Except for a few scattered efforts, its real development dates only from 1929. That it not only survived, but moved ahead rapidly in a period of financial depression and political revolution is an unspeakable sign of its lustiness. What it might have been after its first eight years had it been born in more propitious times is anybody's guess. But just fast enough out clear and plain, that in spite of setbacks and discouragements,

today we lead the world in air transport speed, comfort and safety.

No finer flying equipment exists than is in service on U. S. air lines, domestic and foreign. No technical advances in planes, engines or equipment is allowed to collect dust on shelves waiting for some appropriate time for installation. Our operators have never hesitated to scrap thousands of dollars of equipment already in service when something newer came along. In few industries is obsolescence so high.

No finer group of men has ever been assembled anywhere in under the banner of American transport aviation. Pilots or pilots-in-training, most of them are young, all of them are highly trained, and, above all, are keen about their jobs. To them this aviation business is something more than just making a living.

in itself one of the chief reasons why we are progressing so rapidly.

Our operating technique is far and away ahead of anything of its kind in the world. Here again our operators cheerfully accept the heavier rules of yesterday in favor of a better one for today. And they are constantly on the lookout for every sound and

their experience. To the outstanding work of these committees may be credited many of the notable advances of the past few years.

In the field of communication and in all sorts of navigation facilities along our airways no stone was being left unturned to render operation more satisfactory. In thinking about radio as applied to aviation, however, it must be remembered that the art is very new and that we are still encountering natural conditions heretofore unknown or which are simply beyond the limits of our present knowledge. Radio transmission is subject to all sorts of vagaries, some of which have been already solved, others remain yet to be discovered. The whole history of airline safety has consisted in the closing up of loopholes as fast as they are discovered. As rapidly as any new hazards turn up, men are forced to eliminate them.



improvement for tomorrow. Conditions are changing so rapidly that everyone in the business has to run with wide open throttle to keep from moving backward. The addition or change of some small necessary may modify the operating technique from point's concept to maintenance sleep. But no new project that might make for additional safety has ever been overlooked simply because it might cause some inconvenience. No industry in the world is so constantly on its toes looking for new things to make operation safer.

ONE OF THE MOST HEALTHFUL IDEAS in this connection is the strong trend toward cooperation which has grown up among the several airlines. Recognizing that all have common interests the old "closed shop" idea (as far as the interchange of information is concerned) has been forgotten. Interface committees on maintenance and operations meet regularly to pool



MAINTENANCE

Our airways and their equipment have come in for some criticism lately, but right here we put our finger on one of the real restraining factors that has been at work in the past few years. Large scale projects for airways development are, like the light-house service, necessarily a function of government, as no operator could afford to install and maintain the complicated machinery of the airways (although airlines operators have actually had to do something of the sort in order to get facilities installed which they believed were adequate for their needs).

Eventually, then, politics enter the picture, and where politics appears, progress inevitably follows.

IT TAKES A LOT OF MONEY to carry out a satisfactory airways program, and sufficient funds have not been available in the past few years to keep pace with the progress in the other branches of aviation. If we are to continue to advance in safe transportation by air it is of utmost importance that new funds be made available and quickly, to take care not only of improvements in the existing airways facilities that have been asked for by the air lines, but also to keep up with the new things that are coming along so rapidly. The Congress should pass, and the President should approve the appropriation of enough funds for the next few years to bring our airways systems to the point where plans will have at all times every possible aid for the flying of their routes with safety.

Accompanying this recently made a study of Bureau of Air Commerce statistics which reveal a very creditable reduction both in passenger and in crew fatalities for the four major domestic airline systems, lines that flew over 50,000,000 passenger miles in 1936. Comparing the last five years (including 1936) with the two-year average 1934-35, (which are the first years for which passenger-mile records are available), the number of passengers killed per million passenger miles flown was reduced 81 per cent. On the same basis, employees killed in accidents per million miles flown was reduced 36 per cent. This over a period when crossing speeds were boosted from a 100 to a 150 average is close to the 200 in a 90 mark. Further analysis of Bureau of Air Commerce records revealed the fact that seven air transport companies in the United States have operated five

(From Page 35)



DISPATCHING

Whether it be 5, 15, or 30 million dollars, the money should be available for spending as efficiently as possible to modernize our airways and to provide for the acquisition of every new idea that comes along that will make for greater safety.

But even during the period when money has been scarce our airlines have made notable advances in safety. Lew K. Palmer, secretary of the National Safety Council's Advisory Committee for

RADIO





Service that places one people after all. Here's Colonel Ralph A. Smith, the New York-based, you should know, the designer of the new and better service that places one people after all.

1,000,000 Passengers Can't

WHEN MADE IN 1934 American Airlines' Ralph Dumas, then president of Eastern-Wing's St. Louis division, found a unique answer to that vexing domestic question, "Where have you been all night?" The answer, (not recommended for general application), was "In the sleeping" night after night it worked for Ralph and his associates, and it is recorded that Mrs. Dumas became so fascinated by their problem that she contemplated her own idea after passing a night or two in the famous berth built in a second corner of the plane to study high altitude sleeping problems.

Behind this persistent effort to produce a flying palace in which passengers could sleep in comfort and make the necessary changes in airline with maximum security was a firm order for design plans from American Airlines, a pioneer in the transformation of railroad sleeping cars to the air. Five after the Douglas DC-3s began to replace the slower Condors, American split its transcontinental zone into two sections for day and night operation. Schedules were arranged so that passengers flew in the DC-3s of the Eastern division by day and in the Condor sleepers operating between

St. Louis and Los Angeles, by night. And, with the advent of the Douglas DST, through sleeper service was instituted on the transcontinental overnight.

While the passenger work in high altitude sleeping was one of American's outstanding contributions to air transportation, it was not one of the major achievements. There were other accomplishments and other night workers who sacrificed many a sleeping hour to see them through.

For example there was Vice-President Charles Rosenbaum, who, as general sales manager made it possible for Americans to find the way toward quality sales of air transportation at a discount. His "air travel plan" which has been adopted under the name of every big line of the major airlines, has advanced large business houses and individual travelers to open accounts in large numbers to take advantage of the 25 per cent saving in cost and the convenience of travel charge accounts.

Up Boston way there is a fellow named Tullage whose name has been to become somewhat famous in the generation of traffic and his contribution to the technique of



A president who went to know his employees—C. R. Smith.

passenger handling takes the time of selling 32 seats as a 21-passenger airplane. Other airlines are occupying in the development of this system for control and.

From more recently, employees in the New York office have been acting as guinea pigs for Mrs. Peril V. Mitchell, newly assigned customer service director for the space. Miss Mitchell has been over seeing all 80 employees of the New York office in the process of conducting research in preparation and handling food.

But all of this latter day research and development is so much remarkable than the formation of the system itself from a widely scattered collection of fixed line operators and charter services, and its refinement

The story of some of the people who made American Airlines what it is today

Be Wrong

after the contract cancellation date of 1934. At the completed stage picture were broken up into several pieces, it would make a considerable pile. To get back to the beginning we must turn our attention to again Washington to the Connecticut Valley.

Something in the direction of the flight of less has captured trans-

portation men for years, and the name "Joe Lutz" has probably been applied at various times to stage coaches, motorbuses, and wandering bands. In that it is not, it was the name selected for a planned charter service organized at Washington in 1935 by Governor Franklin D. Roosevelt, Harrison Whitman, Donald Turk, Tullage Freeman and other citizens

Two years later they flew, Joe because Colonel Air Line, two and after the passage of the first Kelly Act, Colonel was awarded U.S. Air Mail Contract No. 1, operating between Boston and New York via Hartford.

AFTER A MERGER with Eastern Air Transportation, Inc., the name was changed to Colonial Air Transport, Inc., which later added Constellation Airways between Albany and Montreal and renewed Foreign Air Mail contract No. 3 from the Post Office Department. But by this time other personalities in other parts of the country were hard at work carrying out the other parts of the master plan.

In the Southwest major transportation material was developing in the form of a young business associate of Ulysses Magnus A. P. Barrett who had been made treasurer of the latest Roosevelt acquisition—Texas Air Transport, operating from Dallas and Ft. Worth to Brownsville and Houston. When Southern Air Transport was formed in a holding with the Texas Air and affiliated companies, Treasurer C. R. Smith took

(Continued on page 12)



Above: Milk did between which also furnished weight control for the airlines. Ralph Dumas, brother of Colonel sleeping, told him how well in the last Condor.



"Like a Kitten"

In Sound-Proofed Sleepers

By Henry Bruderlin

PATIENTS SLEEPING COMFORTABLY IN AIRPLANE CRUISING COSE 10,000 miles are least are beginning to complain of being awakened by over-cautious seating or the click of a reading light switch from the far end of the cabin. No surprise then if companies operating the latest Douglas DSTs must soon display the familiar "Quiet is requested for the benefit of those who have retired" signs on night flying sections.

As a matter of fact, the low ebbings of 70 decibels channel for the mean edges of the new DST planes

the airplane is direct competition with the newest automobiles. Measurements show that the noise level in certain new cars at 45 m.p.h. is the DST planes at 380 m.p.h. Although the older DC-3 Trans-jet represented an outstanding achievement in noise reduction at the time of its introduction, subsequent studies indicated that during its use and in weight could be accomplished by revising the original soundproof-

ing of the airplane. The experience gained in revising the DC-2 greatly aided the acoustical treatment of the DST series, for the same materials and installation procedures were used, with some refinements. Distribution and amount of material required for the new model were different from the DC-2. Optimization of the Douglas sound department was undertaken for the purpose of passing research

on materials and methods in actual application, as well as to prevent irreparable acoustical errors in design or in execution by providing constant and experienced supervision at the work progression. The final results are shown on the DST, where features are unusually low noise level and security of rest throughout the entire trip, comparatively low weight of soundproofing materials. Results were accomplished partly by careful planning.

Physical arrangement and mechanical and structural design kept the ultimate degree of quiet obtainable more than is generally supposed. By providing the most suitable conditions for each of these factors, it is possible to have comfortable quiet without the use of soundproofing materials. A past original arrangement or badly structural design causes a noisy interior almost regardless of the amount of material used. Although it is generally possible to

partially compensate for a disadvantageous basic design feature by the addition of proper acoustical treatment, it behooves us, in view of the very high cost of excess weight to seize every opportunity to select the design, within required limits to maximum beneficial advantage.

DISADVANTAGE FOR SOUND CONTROL on the DST was begun much earlier in the process of development than is laid down on the DC-2, but it was still not early enough to provide for desired propeller clearance. This is partly compensated for by the nervousness of the fastings and will have little effect at pains more than five feet from the plane of the propellers. The net result of the close clearance is that to prevent vibration distribution on the structure, and to raise the vibration amplitude in the vicinity of the propellers.

The region of the fuselage side wall is nearly always at any rate

the most difficult to treat acoustically. Fig. 1 shows how the noise varies along the outside surface of the DC-2 or DST fuselage. Consider that the cabin extends to within 2 ft. of the plane of the propellers. The variation is not in the length of the cabin is in such type if we need the very lightest treatment in the rear end of the ship, the weight of insulation required to compensate for the rise at the front and would be prohibitive. Below a moderate vibration in cabin leads inside the fuselage airplane must be accepted or the front wall of the cabin must be moved further back. Now the general insulation value characteristic of a reasonable soundproofing weight for typical propeller noise is about 36 db. The lightest weight of treatment that can be used possessing the desired interior finish, gives an reduction of 30 db. In order to have the noise level uniform throughout the cabin, we must limit the extent of the cabin to the region in which the

(Turn to page 10)

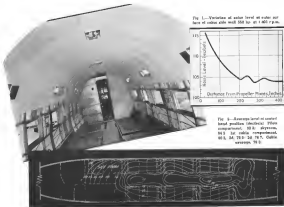


Fig. 1—Variation of noise level in cabin at 10,000 ft. alt. with 360 hp. at 1,400 r.p.m.

Fig. 2—Noise level at seated level position (decibels): 70 db unpowered, 80 db airplane, 80 db for cabin compartment, 85 db, 84, 78.5 db 70%, cabin section, 70 db.

Work Shop on Wheels

Pan American develops colossal servicing stand
for Pacific Clippers

WHEN MARTIN TYPE CLIPPERS arrived at Pan American's West Coast base for the Pacific operation, it became apparent at once that something rather special in the way of servicing stands would be required to take care of the four motors. Necessary was a complete portable work shop 15 ft. above floor level, strong enough to hold the combined weight of two engines and propellers, not to mention the crew of 12 mechanics, their necessary tools and equipment. Necessary also was power supply, compressed air, exhaust, all driving arrangements, shop cleaning equipment, and a full complement of flood and portable work lights.

Long years of experience with servicing large ships at Miami and elsewhere, furnished some basic

ground, but when the two new stands were completed, they represented quite an advance in size and in completeness of equipment over anything else that had ever been built. The few things were overlooked may be judged from a study of the accompanying photos.

Two complete units were made up, each capable of handling two engines. When all four engines of a ship are being worked on at once, a railway connects both platforms. Interconnections for electric power, compressed air, etc., are provided.

Each stand now weighs approximately 2½ tons and each is built in such a way that it may be readily moved to take care of larger future planes. Each unit is mounted on six 18-in. dual casters, but when in

use, the weight is carried on six large screw jacks which raise the whole clear of the floor. Twelve men are required to move each unit into position.

Two working levels are available, the main floor on which the work benches are located, and which is reached by a stairway from the ground, and a drop platform that just below the main floor to give access to the under sides of the engine nacelles for all drainage, oil flares, etc.

Two poplite pits are built into the main floor, with built covers to close them off when not in use. Likewise the pits at upper elevator equipment for working down the engine. Climbing ladders are a part of the work ladders, and a choice in available one which could step may be chosen for delivery to a stand landing just below. The upper wing systems may be reached from the platform by using the hinged bridge-like member steps at each nacelle.

Directly below each engine a steel draining pan has been built into the platform. These pans are strong enough to support the weight of two men. They are designed to collect engine draining compound, so as handle lubricating oil drainage. For the latter purpose, 2-in. pipe lines connect the two metal basins to oil drums at ground level.

An interesting installation down near floor level is the plane cleaner's

locker which is fitted with everything to take care of hanging plates, "type and spec." cards and so on. The main supply connection and the distributing system for compressed air (for paint spray guns and for air hammers, etc.) and for electric power are also conveniently located at floor level. The entire electric system is of approved construction and provision is made to ground stands to avoid any trouble from static.

SPECIAL FEATURE is a portable instrument that enables which is connected into the stand at ground level which permits the testing of the automatic pilot and fuel control systems on the aircraft without running up any of the motors.

Great care has been given throughout to the handling of fire.

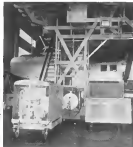
Oil handling arrangements. Each of the motors is pumped from a portable oil belly in flexible connections on the drop platform. In the lower right-hand corner is the portable instrument for testing.

"A place for everything" that has to do with handling planes clean inside and out.

ble power, water and air-lines. In addition to the permanently wired electric cables all over the stand, beside the cleaning locker is a collection which contains eight-100 foot rubber covered extension cords, individually switch controlled, each coiled up in its own compartment. All electrical connections are at the overhead type for safety. Air valves used are all the self-closing type so that when they are closed, the pressure is automatically released.

from the floor. All the valves have been installed in the proper angle to avoid leaking of hoses connected to them. Air lines are fitted with rapid hose connections. A filter is provided at the main air connection to insure delivery of dry air to paint spray guns and in air hammers.

In the design and construction of PAN's work-stand such no detail has been overlooked that would add to the safety and convenience of the servicing personnel.



Propeller showing the accessibility of the four-row engine. Also the bridge connecting the two workbenches with the wingman.

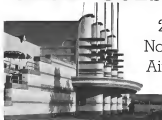
This included too everything. Note metal inverted work benches with eye lines on summer lights, engine drip pans, the shop sinkholes with painted safety colors, plane cleaner's locker and power distribution system controlling wheels and screw jacks.

Maintenance
Note Book





SHOW GOES WEST



2nd Annual National Pacific Aircraft & Boat Show

BEFORE THE BEGINNING OF 1950 it was a dangerous undertaking to run an air show but the Brothers Handerson broke the ice last February and found the industry was more receptive. Now they are due for a return engagement at the west coast and the industry is still more enthusiastic. March 15 is the opening date and a month earlier date were but five exhibitor's booths would. Both shows have been staged with the motor bus industry, a logical step because of the similarity of prospects.

The proceedings will begin with an elaborate inaugural ball on the opening night. Cooperating organizations include The National Aeronautics Association, The Airy

Birds, Arizona's Port of the American Legion, The Shellfish Area Squads, Eastern Aeronautics of America, Naval Reserve Corps, WPA, Los Angeles Junior Chamber of Commerce, Women's Air Service, Air Corps Procurement Division, Junior Division, Air America, American Red Cross Club and the California Air Industries Association.

Twenty-five of the country's leading aircraft manufacturers have agreed up to display thirty-one of the nation's latest aircraft models ranging in size from the midsize Waco Wilderness Arrowplane to the latest giant Douglas C-124 transport just off the production line. All of the aircraft engine manufacturers including Pratt & Whitney,

Wright, Continental, Jacobs, Kaiser and Warner will also be represented. Many of the plane and engine manufacturers have doubled their space over that of last year.

The Aeronautics Company of America, Bendix Aviation Corporation, Berry Brothers, Curtiss-Wright Technical Institute of Aeronautics, the Pacific Aircraft Corporation, the Standard Oil Company and Thompson Products all plan display exhibits at the show which is expected to draw an attendance of more than 100,000 people this year. Last year's total was 75,000.

Special openings prior to the show to the both Chambers duty staged each year in connection with the National Air Race, Handerson

said, are being planned as are a variety of technical meetings and social activities during Aircraft week in Los Angeles.

The Los Angeles show is sponsored by the California Air Industries Association, Ltd., endorsed by the Civil Aeronautics Association of Southern California and has the sanc-

tion of the Aeronautical Chamber of Commerce of America.

The Pan-Pacific aviation exhibit, 11,000 square feet of floor space and is doubly staged. It was held especially for aircraft shows. Many new models not available for the recent New York show will be shown for the first time.

In the marine division of the show 1950 model cruisers from ramp-door to 81y foot in length as well as 55-foot motor craft including speed boats, sail boats and boats will be on the show. The Marine space taken this year, Handerson said, is double that taken by manufacturers last year.

Booth	Booth	Booth	Booth
1-2	10-11	19-20	28-29
3-4	12-13	21-22	30-31
5-6	14-15	23-24	32-33
7-8	16-17	25-26	34-35
9-10	18-19	27-28	36-37
11-12	20-21	29-30	38-39
13-14	22-23	31-32	40-41
15-16	24-25	33-34	42-43
17-18	26-27	35-36	44-45
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43-44	52-53	61-62	70-71
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47-48	56-57	65-66	74-75
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51-52	60-61	69-70	78-79
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423-424	432-433	441-442	450-451</

Our Two Planes Are Indispensable

Says
Frank E. Gannett



A newspaper publisher flies
for business and pleasure

ONLY A FEW YEARS ago I foolishly said I would never fly. I thought that aviation was not safe and I had too many responsibilities to risk my chances in the air. However, I was persuaded to take a little spin over Lake George in an amphibious plane owned by Stoll Macy who had an exceptionally good pilot from the Sikorsky factory. The experience was so delightful that in the

afternoon of the same day, I took a cross-country trip from Lake George to Albany and back. We averaged about 100 miles an hour.

Although the experience was thrilling, I was not yet convinced of the safety of air travel. Nevertheless, I saw that if I could fly from one city to another, I could save much time in visiting my various newspapers as well as in my frequent business

trips to and from the larger cities. This one day I chance to meet Lt. Commander Russell Holderman. He had flown with Lincoln Beachey and since then, has built up a notable reputation for his ability as a pilot and his skill with gliders.

Commander Holderman invited me to the airport. He showed a newspaper on the field, floating it down with four rocks. He then hooked his glider to a plane, went up about 1,000 ft. The glider was out loose, and Holderman deftly brought the glider down so it was resting on the newspaper. I marveled at his accuracy and his ability to control his glider.

As a result of this demonstration, I contacted Commander Holderman to buy an airplane that would be suitable for my purposes, and in a few weeks one was going to be in a Stinson Colinet. Since then my interest in flying has steadily increased until today I prefer it to any other mode of travel.

My first ship was delivered in

April, 1934, and in the next eight months I flew to places in two hours which would have taken me eight hours on the train. I found it possible to visit cities remote from my office and be able to sleep in my own bed instead of in a Pullman. My working hours that were multiplied, and by using the airplane it was possible to accomplish much more than before.

The following winter I made several trips to my winter home in Miami Beach, covering the distance comfortably in one or two hours. The trip by rail required two days and two nights, much of it not very comfortable.

I flew about 300 hours the first year in this ship, covering 35,000 miles without as much as a bad landing. I soon noticed, however, that with a larger and faster, up-to-date machine, I could fly even more comfortably, both upon as fast and with even greater safety, in the most modern ship had three cabins, a two way radio, blind flying instruments, and carried a co-pilot. So, in November, 1935, I purchased a Stinson tri-motor Model A plane, equipped with full length bed, wash room, lavatory and more comfortable seats, desk, table, controllable push propellers, two-way radio with auto-reverser, blind flying instruments, retractable landing gear, landing flaps. I have since learned from Holderman that it is a whole new world. I am able to accomplish more work and I do it as a freer man, for air

traveling is less strain on the nervous, and the whole system. Also, I have more time with my family and for business and recreation.

The first year with the new plane I covered over 60,000 miles without the slightest mechanical trouble, and have completed my trips with very little delay on account of weather.

One concern also found that a similar plane was necessary for good will, flights, photographing, short trips with reporter, etc., and generally very useful. We have almost taken pictures of wrecks and floods that gave our papers stories by hours—sometimes a whole day ahead of our competitors. We have covered areas to help raise lives. In all, we have found that our two planes are indispensable, not only for our own and good for our country, but for afterward general business. We have proved with up-to-date equipment, proper maintenance, careful pilot such as we have, it is a safe means of travel.

Since I bought my first plane, I have traveled almost entirely by air. I found that the only serious moment I have in using my plane are in the trip to and from the airport by automobile. I am nervous in a car, but absolutely relaxed in a plane.

In reaching the conclusion that I would fly into the air, I reasoned that the greatest-day concern early gone trouble and even when they do, a pilot like Commander Holderman can land safely after a long glide.



Frank E. Gannett, left, and Pilot
Russell E. Holderman

I was pointed out to me that planes licensed by the government are carefully inspected and that manufacturing is so definite as to leave no doubt.

An important safety factor is to have a pilot physically fit, one who has good judgment and who does not take chances through flying is too weak. What a plane is equipped with a two-way radio and the latest instruments, safety in the air is still further increased.



AVIATION
March, 1937

The Technique of Water Flying

SEAPLANE HANDLING

By D. J. Brimm Jr.



Ford Trimotor Landing Midway Airport

IF YOU ASKED that a disproportionate amount of space has been given to handling on the water, but this is the most important part of seaplane flying. In the air, a seaplane is the same as any other airplane, and, under control conditions, there is no very great difference in take-off and landing. However, there are a few tricks which may make things somewhat simpler for the aviator.

In the first place, while this difference is by no means intended to hinder the aviator more properly confined to engineering, there is one thing which affects to a marked degree the take-off of the seaplane as compared with the take-off of the same ship on wheels. This is the propeller.

It should be borne in mind that when a ship mounted retractable landing gear is mounted on floats the drag

in top speed will be from five to ten miles per hr. in most cases. Also, a great deal more power is needed for take-off, due to the friction of the water on the floats. These two considerations call for a difference in the design of the propeller. This difference is in the form of depressed pitch, often coupled with a slight increase in the diameter. The retractable pitch propeller gives the best all around performance, but is relatively heavy and expensive in the case of a medium-size ship. Leaving the retractable out of consideration and taking account of one weight, engine cooling, and general efficiency, it has been the experience of the writer and others that the one-piece tapered fixed prop, the wooden prop, and the adjustable metal type are desirable in the order named. And if engine is an important consideration,

the wooden propeller in most cases is by far to be preferred.

There is no essential difference in its behavior between the seaplane and the flying boat. Getting 'on the ship' has already been described. If the ship is to be flown, the diameter is of course left open. A light back pressure is maintained on the control until the ship has built off. Most seaplanes, if the customer is not for a steep climb, will take off in normal water with the controls untouched from start to finish—other words "built off."

If, at some water or in rough, the ship will begin to bounce from time to time as flying speed is approached. The pilot tries to keep the nose down as the plane goes into the air and pulling back on the controls again just

before the next contact with the water. While on the water the nose should be kept well up to avoid jolting the load into a surge. Fortunately, when the waves are high there is usually a good wind and the bouncer doesn't last long.

In gluing water, what there is no wind the mistake of attempting to drag the ship into the air should be avoided, as pulling back too much on the controls naturally lengthens the take-off run. This point cannot be emphasized too strongly, particularly in the case of biplane pilots. It may even be said that there are times, such as when the ship is heavily loaded, that this dragging process will keep the ship from getting off at all.

The ideal position of the floats when running on the ship is with the stern just clear of the water. This gives the maximum angle of attack on the wings with the minimum of water resistance. If the water is smooth and the load heavy, the ship may slide for a few feet before getting up by itself. This is done as follows: hold the control back until the nose will rise no higher than peak the wheel or stick all the way ahead, immediately pulling it back again. Two or three repetitions of the action will get the ship on the way when otherwise it might be impossible. When taking off in a harbor or where there is much traffic a sharp lookout should be kept for swells caused by ice boats as these are

likely to give the floats rather severe jolts. Once good take-offs, even in winds of considerable strength, may be made without much difficulty if the ship is put on the ship into the wind and turned around and after that speed—and hence control—has been obtained. Downward winds are also easy enough if the wind is light and the ship well powered. The beginner, however, will do well to try no tricks at first.

It must be remarked before there is no particular difference between land and seaplanes. Naturally, once the seaplane is slightly heavier than the same ship on wheels, the performance will be a shade less elegant, but the average pilot will barely notice the slight loss. In a steep climb, the seaplane usually requires less lift than to maintain the ship.

Landing a seaplane is somewhat more a matter than landing on wheels, but it is not as difficult as it is not necessary to hold to anything like a three-point position. As long

as the stick is moving back at the rate of contact the landing will probably be smooth, regardless of the attitude of the ship. In rough water, an effort should be made to get the tail of the floats in the water first, or, in other words, the seaplane should be in a tail stall. It is also desirable under these conditions to leave the engine partly on and drag the stern of the floats in the water before entirely closing the throttle—the "powerglide" landing.

The powerglide is also used when landing in the dark or in poor water. The latter, especially if there is a fog or heavy haze, is the most dangerous condition likely to be encountered, so even the most experienced pilot cannot tell just where the water is. If there are any objects on or on the water, such as buoys or logs, land as near them as possible, and watch them rather than the nose. If the shore is visible, that also provides a landing guide. If, however, none of these are available, the powerglide landing should be resorted to—come up and engine

Seaplanes are maneuverable. A. When built up through a slow roll.



Wing rolling at Miller speed

on just enough to allow a gradual settling of the ship.

The beginner may wonder what to use for a rear indicator when over the water. If there is an appreciable current, any boats or other will point into the wind. If there are no boats to be seen and there is enough wind to amount to anything, its path will be shown by streaks on the water. These streaks do not, however, show from which direction the wind is coming—in other words, by landing with the streaks, the pilot

(This is Page 78)

EDITORIALS



AVIATION

MARCH 1937

NEXT STEP

What good were the three days in Washington when the air transport industry and the government parted all their cards, yet their feet under the same table, and "billed fairly"? To readers of AVIATION it is no mystery that few words in the language appear to us more free of "cooperation." If this business is to get anywhere at all it must be done "cooperatively." If the business is to get the coffee of last summer, but by consent and unobtrusive cooperation among every agency involved.

It was to such a healthful atmosphere that the February Daily Conference was held. We think that cooperation was done all around—in the Director of Air Commerce and all his assistants for their own and able handling of a difficult situation—in the air line individuals and their representative associations for an obvious willingness to discuss problems openly—in the associations and other individuals who contributed of their time and equipment—in the press for their generally fair reporting of material that they might have made cheap and mean about. Finally, it was a glass of good judgment on the part of Commerce officials to attend the newspaper boys in the meeting.

There was a few men extra—but very few. The most harassed "Baltimore Roadster" went off with a very little gas. A few others found up—publishing writers, columnists, and people with personal notes to write—but they were obviously handled and not pushed in upon the already progress of the meetings.

However, in this issue we have detailed the general results of the meeting—the program for the future. If the letter can be carried out as planned the meeting may go down as a real milestone in air transport history.

The laymen in the D.C.—and the only concern to that is HENRY—must remember that we have the possibilities.

Right here is a place where a little further application of the co-operative value is necessary. The A.T.A. wants business either to do the job of maintaining the airways. Col. Nelson says he doesn't want that much more, says he can use only five times this year—that we not operate at fifty miles when he needs it. This is most news of course, but Congress can't be blamed for running such a situation with some confusion. Clearly, the most necessary form of cooperation now needed is for the A.T.A. and Commerce to coordinate their plans and to work out a well defined program for presentation to Congress. The time on this bill will thus have no valid reason to withhold the funds that are absolutely necessary to keep our airways system abreast of our rapidly advancing operating techniques.

COMMISSION ON "COMMISSION"

THE ESTABLISHMENT of special aviation commissions is a business money state legislatures today believe from the inside it seems likely that before many years every commonwealth will have some form of regulatory body to keep tabs on air-

line activities within its borders. In principle we think the idea is sound, but in practice it carries along with it many potential dangers. Because aviation is a business it is highly specialized. It does make sense that its interests would be better protected by a group of specialists or the Government's chosen men by industry back-up, uncorrupted and not specially attar-

acted by individuals through channels that date from the "boom-and-bust" era. But what measures can we take that such commissions will be set up with the interest of aviation solely at heart? What measures can there be that they would not become simply another means of having political rewards—to be peddled with section handouts at the cabinet?

A reasonable tax program set up for the development of necessary aviation facilities within each state may be contemplated without undue enthusiasm, but it history thus takes out of the aviation industry is to go into the pocket of the Federal or to be devoted to non-aviation channels, then there is plenty of cause for alarm. The only effort will be to drive most of the aviation facilities out of such a state, as has actually happened already.

Right now is the time when it is badly impaired for all individuals, states, and associations in every state in the Union to keep their mouths as pending legislation, is made absolutely certain that the same laws are not being written and the people who are being applied to realize them will really give intensive aviation the back it deserves and not simply turn it into another political handle. The only way it can be done is to make certain that State Commissions are manned by competent aviation people and not by politicians.

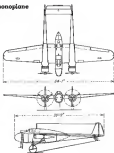
BOY MAKES GOOD

THE COOLEY BOY was rated the old house officer—last of a line after about 100 the Nelson, whose last line had pulled money in national leading driver out of his pocket and to maintain a dollar in two to get common figures. It developed that Bill had worked up with an outfit whose chief seat was an old steamer and had been chosen in a particularly dangerous position of the over hull. They showed only a dollar in a fairly long ride. By spending money only for gas and oil and profitably collected for maintenance, Bill's "red" from the "business" was made from a \$100 a week.

Now "Cooley" is not a hazardous occupation and Bill will probably live a long time if he keeps out of his own class. But it is not his conduct that we look further ahead than his safety to end up in a beautiful crash accident and ruin the business at many of the well established operators who are spending money to keep their equipment in safe operating condition.

Deadliest Weapon?

Fokker's latest is two-place twin engine monoplane with unconventional features



What's new in aircraft, engines and motor accessories



The Fokker G.I as it was exhibited at the Paris Salon.



Top: Rear view of the wing structure showing where struts and cables are attached. Bottom: The engine mounted in front of fuselage.

Maximum speed with the latter engine is given at 290 m.p.h. at 14,500 ft. altitude, and with the Hispano-Suiza engines maximum speed at sea level 294 m.p.h. at 13,400 ft. 290 m.p.h. and at 15,700 ft. 290 m.p.h. Climb at sea level is approximately 2,000 ft./min., absolute ceiling is 30,500 ft. and normal range with full tanks 1,800 miles.

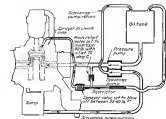
Of equal interest with such performance is the armament which consists (as on attack planes) of two 23 mm cannons and two 7.5 mm machine guns in the nose, where their field of fire is unobstructed. 30-ft. machine machine gun is carried in a fully retractable turret in the sharply pointed tail of the fuselage nacelle, where, due to the rear boom tail construction, there is an unusually wide and favorable field of fire for working off possible attacks from the rear quarter. Although the field of fire to the side is slightly restricted due to the gun being by the tail boom, this is of no consequence as due to the superior speed of the plane it is unlikely that a hostile attack will be made from the side. There is some question too of the effectiveness of machine gun fire when at speeds of 200 m.p.h. or better.

Since Fisher has long specialized in the development of advanced type military aircraft it is to be expected that all features of armament installation and operation, including both make and sights, and provision for manual, has been provided for with unusual care and experience. Provision has also been made for installation of a Hughes Type V.R. 27 characteristic transmitting-receiving radio set.

Specifications and performance as supplied by the manufacturer are as follows:

Engines—2 Hispano Suiza 10-02 750 hp	
Wing span	33 ft. 1 in.
Length	35 ft. 9 in.
Wing area	175 sq. ft.
Wing load	16.5 lb./sq. ft.
Wing empty	2,600 lb.
Empty load	3,000 lb.
Gross weight	5,600 lb.
Wing loading	32.0 lb./sq. ft.
Power loading	6.5 hp./sq. ft.

Performance:	
Max speed (sea level)	294 m.p.h.
14,500 ft.	290 m.p.h.
15,700 ft.	290 m.p.h.
13,400 ft.	297 m.p.h.
17,000 ft.	287 m.p.h.
Climbing speed 11,400 ft.	237 m.p.h.
	(105% power)



How the biplane oil system works.

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Climb to 5,000 ft.	18 min.
5,000 ft. to 10,000 ft.	44 min.
10,000 ft. to 15,000 ft.	50 min.
15,000 ft. to 20,000 ft.	141 min.
Climb—absolute	26,500 ft.
Service ceiling	26,500 ft.
Altitude (1 engine)	15,700 ft.
Range—full tanks	1,800 miles

Birotal Oil System— permits immediate full power operation of engines

ON ENGINE INTENT TO SUPPLY AIRCRAFT where the time factors from engine start-up to take-off is often of extreme importance, a new high-speed oil pressure system announced by the English Birotal company will prove of interest to American engine builders and others. This system has been developed to eliminate the delay which generally occurs from the time an engine is started until the lubrication system produces sufficient pressure to take over the operating work.

Essentially automatic in operation, the Birotal auxiliary oiling system incorporates a restrictor and governor valve which acts to direct oil into the engine at a specific pressure, directly to the crankcase bearing when the oil supply is still too cold to flow properly through the main channels in the crankshaft. As the oil becomes warm the restrictor opens to be situated and oil is supplied only in the normal manner.



The Casey Jones Amphibian during recent test flight at North Beach Airport.

Belt Drive Boat—

with Terraplane engine built at Casey Jones School

SOME TIME AGO, when Lee W. Wainwright of the Casey Jones School was experimenting with belt drives, we suggested that he had some broader application in mind. Now it has come to light in the form of a floatplane pulley amphibian with an automobile engine and V-belt driven propeller. Preliminary test flights have been conducted to the satisfaction of Wainwright and Walter Haeberle, under whose direction the ship was designed and built.

In the tests the ship, as a flying boat, weighed more than 2,000 lb.

Some time ago, when Lee Wainwright of the Casey Jones School was experimenting with belt drives, we suggested that he had some broader application in mind. Now it has come to light in the form of a floatplane pulley amphibian with an automobile engine and V-belt driven propeller. Preliminary test flights have been conducted to the satisfaction of Wainwright and Walter Haeberle, under whose direction the ship was designed and built.

The boat is a two-cylinder Terraplane with the wing resting along the top of the hull. The wings on the present model are standard ship and fuselage construction, though designed to be built later in metal. A fibreglass gun rack is located in each wing. It is planned to locate the gun in the hull when the landing gear is installed, to use the well in the wings for retracting the landing gear. The hull, constructed with one piece, is built of 1/2 in. plywood, perimeter struts being given to economy of construction. Presently all parts are flat plates bolted for strength and attached by rivets in a series of boltholes. There are three view-light components, long-gage ones and, the two units located to the front, the motor located over the C.G. and behind the pilot. The vertical fin is an integral part of the rear of the hull and the control surfaces are tubular metal, fabric covered.



The motor is the stock Terraplane engine developing approximately 100 hp at 4,000 r.p.m. No change has been made to the motor except to replace the normal exhaust stacks with straight stacks and to bolt the lower pulley to the motor ring. Standard starter and generator are used. The upper pulley is supported by a cluster of tubular metal struts and carrying the propeller on a dead shaft. The two V-belts located at the rear of the engine compartment (manufactured by the Massachusetts Rubber Company) are approximately five feet between centers and the ratio between the upper and lower pulleys is 2 1/2 to 1. Both the belts and the Terraplane motor were previously given a 200-hour test, 240 hours of which were at 70 per cent throttle and the balance at full throttle, and no serious defects were found during this run. The test flights to date indicate that the performance of the belt drive system is satisfactory. A unique feature of the boat is rubber wing tips which can be inflated or deflated at will. Present plans contemplate further development and test, eventually leading to manufacturing and production.

Barkley-Grow— Flight Tests Scheduled for New All Metal Light Transport Plane

FLIGHT TESTS were scheduled for early February on the new Barkley-Grow "all-metal" light transport monoplane under development by Barkley-Grow Aircraft Corporation, Detroit, Mich. Interesting preliminary details released by the builders indicate its adaptability to use as a faster transport, auxiliary or defense air cruiser, military ambulance or light bomber. Although basically designed as a transport equipped with Pratt & Whitney Wasp Jr. engines the plane is intended to wide modification of power plant configuration and fuselage arrangement.

Of low wing design with low-radar tail the plane closely follows the general formula established by the Lockheed "Stinson" but is clearly distinguished in external appearance by its use of a rigid cant-lever landing gear, which is extremely standard.

The plane has an empty weight of 5,200 lb., useful load of 2,800 lb., and normally accommodates two pilots and six passengers, with baggage.

(Turn to page 31)

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Tues., February 3, 1937

ARMY & NAVY Deadline Recard

In January 1937, Navy Dept. made the largest, 100,000, formation flight in aviation history. Patrol Squadron VP-13, comprising 100 big B-17s, Cyclone-powered Consolidated Navy patrol flying boats and 100 fighters and 100 bombers, flew over the Pacific Ocean from San Francisco to Honolulu. Patrol Squadron VP-13, 100 B-17s, (TWA, Jan. 21, 1937). The Navy's high command steadily saved itself the cost of the flight, this remarkable flight, and it was finally a reaction transfer of men and equipment. Last week the Navy released another "expense transfer of men and equipment," Patrol Squadron VP-13's 100 B-17s.

One thousand B-17s, Commander William McDade and his staff and men of Patrol Squadron VP-13, 100 B-17s, 100 fighters and 100 bombers, flew over the Pacific Ocean from San Francisco to Honolulu. Patrol Squadron VP-13, 100 B-17s, (TWA, Jan. 21, 1937). The Navy's high command steadily saved itself the cost of the flight, this remarkable flight, and it was finally a reaction transfer of men and equipment. Last week the Navy released another "expense transfer of men and equipment," Patrol Squadron VP-13's 100 B-17s.

Patrol Squadron VP-13's new flying boats are called PBY's patrol bombers. With 7,100 h. p. Pratt & Whitney engines, retractable wing patterns and dagger-like, they fit the bill for all the ships ordered by the Navy from Consolidated Aircraft Corp.



gaps. Equipped with two Wasp Jr. 88 engines top speed is estimated at 225 m.p.h. at 5,000 ft. altitude, with a cruising speed at 75 percent power at 9,000 ft. altitude at 204 m.p.h. Standard-Standard convertible propellers are used in standard equipment.

An interesting feature is the use of the new synthetic material "Plexiglas" for cabin windows. This material is lighter in weight than glass yet is said to transmit more light and less sound.

Standard fuselage arrangement includes provision of a fully equipped radio compartment at the rear. Finishing construction is now proceeding with 17 57 seats and transport command with 24 57 seats. Unapparent of this area have been reduced to a maximum for another corner, increased strength, and reduced drag.

A main heating plant, controlled by the pilot, is provided for heating the entire plane. Skidproof glass windshield and windows are provided in the pilot's cockpit, with sliding panels for clear vision in all weather.

Outstanding feature in the design of this plane is the employment of the new Bailey multi-span stressed skin wing construction which con-

sists of a multiplicity of full length spars with of formed skin sheet in which top and bottom members are attached. This arrangement produces a number of uniformly spaced full span ribs and completely eliminates the butt and rib joint in use in a conventional wing. Wing structure and covering is of 26 57 throughout. Outer panels are truly detachable without from the engine nacelles which are mounted on the outer section. At the tail the wing structure has been reduced to three main beams traversing the outer box so arranged that no accessories or passengers in conditions while single spans is provided beneath the floor for controls, fuel tank, etc. Flood emergency surfaces are of two span construction with smooth 24 57 sheet covering, while flap, ailerons and all movable

control surfaces are fabricated from smooth sheet solid corrugated sheets of the same material. Two types of flaps have been combined for unusual efficiency, a right flap being used across the outer section, with full flaps of slotted type outboard from the outer section.

Engine nacelles, like the fuselage, are of stressed skin construction. Landing gear is of cantilever single strut type, with air oil shock absorber and providing even wheel travel during travel. Wheels are provided with 26x15 5 in. tires.

Estimated performance with standard engines are as follows: Jacobs 7-2, maximum speed at sea level, 190 m.p.h. cruising speed, 172 m.p.h.

Wright 756-2-2, maximum speed at 10,000 ft., 200 m.p.h. cruising speed 189 m.p.h. (75 percent power).

Lockheed Building 265 m.p.h. Transport

New high speed transport to be flown next month.

A new milestone in the race for speed supremacy for the American aviation industry is announced by Lockheed, Robert H. Griggs of Lockheed. The company now has under construction a new two engine Cyclone powered fuselage plane multi-wing monoplane with a projected top speed at 265 m.p.h. and an estimated cruising speed of 240 m.p.h. The new Lockheed 14 is to be test flown early in April according to factory announcement. Lightest yet built it will provide accommodations for 11 passengers, stewards, and two pilots. In general appearance and construction it will closely resemble the present Electra and Model 12.

Performance promises low weight Lockheed a substantial order for Model 14 transports from a major American airline company was prior to test flights of the first plane. The wing loading of the Model 14, given at 27.2 lb. per sq. ft. is a new high for Lockheed standard for commercial use, and is only exceeded by the Sikorsky 5-2-A flying boats loaded at 29.60 lb. per sq. ft. Two factors make the high



loading is made possible. The first is the exceptionally fine stability characteristics of previous Lockheed transports and which may be anticipated in the Model 14. The second is the incorporation of the Fowler type wing flap. With this flap design it seems possible to load the Model 14 at 30 m.p.h. in still air. The



The support ground equipment is carried in a trailer

Air Track

A new landing system by Washington Institute of Technology

FOR SEVERAL YEARS the Washington Institute of Technology has been hard at work improving a radio-aid landing system of the curved beam type and now it is ready for commercial production. The system was first conceived and developed by the Bureau of Standards of the Department of Commerce and much of the personnel of the Institute was formerly associated with the Bureau of Standards in Washington.

Now come the improved version in "Air Track." It employs a lock-in beam and a curved landing beam and the ground equipment can be completely assembled within a small automobile trailer. Although the trailer unit is readily transportable to any position on the field demanded by wind conditions, the monitoring device remains with the

dispatcher for his guidance. A single instrument in the cockpit of the airplane shows the pilot constantly his position to both beams.

The diagram shows a typical setup. Curved beam is at A, marker beam at B, marker beam at C. The portable transmitter in the trailer is shown at D, and the monitoring equipment is at E.

First installation of the original system was at Newark Airport in



How the Air Track works.

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1933 and later similar apparatus was set up at Oakland, California.

Manufacturing facilities are now being provided by subcontracted interests and a new factory will soon be built adjacent to the Institute's laboratory at College Park, Md.



WRIGHT CYCLONES have flown 60,000,000 Engine Miles in 5 years ON AMERICAN AIRLINES

American Airlines is the first air transportation system in the world to carry 1,000,000 passengers. Wright Cyclones were the first aircraft engines, so the high power plant, to complete 1,000,000 hours of operating experience on the world's leading airlines.

Wright is proud of American Airlines' leadership in being the first airline in the world to carry one million passengers. Wright is especially proud of the fact that this one million passenger achievement was attained with airplanes powered by Wright Cyclones.

Wright Cyclones are used exclusively to power all of

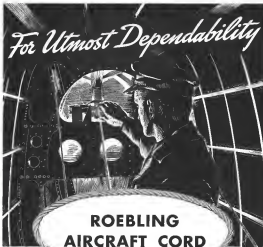
the high-speed Douglas DC-2 and the new Douglas "Flagship" Club (DC-1) and "Flagship" Sleeper (DC-1) planes of American Airlines. During the past 5 years alone, Cyclones have flown 60,000,000 engine miles on American Airlines' great nation-wide system.

The giant new American Airlines' Douglas Sleeper and Club "Flagships" are each powered by two 1000 horsepower Wright Cyclones—the most powerful aircraft engines in airline operations. The dependable performance of this type of engine is backed by more than 100,000,000 engine miles of operating experience on leading airlines throughout the world.

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Buyers' Log Book

What's New in Accessories, Materials, Supplies, and Equipment

Arc-bladed Props— introduced at show by Maynard di Centre

FIRST INTRODUCED AT THE NEW YORK NATIONAL AIRSHOW Show, four aircraft propellers bearing the patronage of Commerce Certificates are now added to the industry by the Maynard di Centre Propeller Corporation, Milwaukee. The blades of all of these propellers feature a double arc, and three of the four types—the monotonic, the constant speed, and the adjustable pitch—have the blades set at the hub. The fourth propeller, known as the fanless type, has its blades set in the elementary manner but is otherwise conventional.

It is claimed that the purpose of the blades is to bring the point of fatigue four inches closer to the hub, and that the offset blade arrangement provides better balance and reduces propeller vibration transmitted to the engine. Improved engine cooling is also claimed as a feature of the design. A further claim is that these propellers are considerably lighter in weight than present types.

All of these propellers have been developed under the direction of Euseb, Director di Centre—Aviation, March, 1937.



Motors for landing gear and flaps

Motors for Flaps— and landing gear operation are light in weight

SERIAL ELECTRICITY ELECTRIC MOTORS developed by the Electric Specialty Company, Stamford, Conn., are being sold for operation of wing flaps and landing gear. The type 100A2 wing flap motor is rated 12 volts, 55 amp., 35 hp., and operates at 3,500 r.p.m. The type 100A2 motor for landing gear is rated at 12 volts, 115 amp., 3.4 hp., and operates at 4,000 r.p.m. Dimensions of both motors are approximately 7 1/2 in. by 10 in.—Aviation, March, 1937.

ing product is the new Wilco Piston expanding machine which is said to be capable of expanding and accurately reshaping iron or alloy gaskets. The operation is said to be fast and simple and can be performed with unskilled personnel.—Aviation, March, 1937.



Wilco piston ring expander.

Portable Sander— A New Electric Disc Sander of Wide Application

One of the newest motors to be offered by The Stanley Works, New Britain, Conn., is a versatile electric disc sander of rugged and powerful design, low light weight for hand use.

Known as Stanley Sander No. 77, the new tool is built bearing equipped throughout and has been held to minimum dimensions for work in close quarters. With a 7 in. flexible port this sander is recommended for all applications of such equipment to possible sanding and polishing of wood and metal surfaces.—Aviation, March, 1937.

Piston Ring Tools— for aviation use are developed by Wilensky

KNOWN AS THE Q-THIN PISTON RING COMPRESSOR, a new tool for compressing all types of piston ring toolholders is announced by the Wilensky Manufacturing Co., Philadelphia, Pa. Said to be as easy to handle as a hand saw, the compressor will incorporate a series of bands of variable size with a small compression clamp. The same firm manufactures a patented hydrolic piston ring known as the P-dick Hydrolic piston ring, in a wide variety of sizes. Another Wilensky



Illustration of the Maynard di Centre propeller.

News of the Month

Highlighting recent events in the aviation world

Cooperation for Safety—

is evident in Bureau-operative conference. Devise always and operational improvements recommended

A NEW SURGEON FOR THE TURNING-
VISION OF THE KNOWN ELEMENTS IN
AVIATION OPERATIONS WAS THE outcome
of the Airline Safety Conference
held in Washington on Feb. 4-5-6
by the Department of Commerce. All
through the conference ran a spirit
of cooperation and an earnest desire
to get at the bottom of whatever
troubles there were to be found with
present airline aids. It was unani-
mous, no one expected and no one
feared any one winner in the prob-
lem presented. In fact, the prob-
lem presented in the conference was
the fact that the press was admitted,
and the benefits held in the full
light of publicity.

Bureau of Air Commerce officials
met on the first day with a group
of airline representatives—executive
and technical—which was a veritable
aviation who's who. Submitted for
consideration was an agenda covering
the whole field of radio and com-
munications aids.

The first day's technical session
was followed by a discussion and
approval of recommendations sub-
mitted by a committee of eight com-
munications engineers and pilots' representatives appointed to sit the
wheel from the staff of the opening
session.

On the third and final day there
was another general discussion tak-
ing in operations, personnel, naviga-
tion, airport approach, and survival
equipment. On this day came the
only unusual change in that either
operator or Bureau in the whole
three days.

David L. Beland, president of
the Airline Pilot's Association,
suggested that certain airlines were

"pushing" pilots to fly in weather
which the pilots themselves thought
unsafe. This charge was quickly
disputed when two airlines he
cited both referred to one ques-
tionable incident (the Northwest
Airlines crash on Dec. 14) which he
later admitted had been corrected.
Plans of other lines denied that their
company "pushed" their pilots.

Final recommendations of the
conference were in two parts: A list
of eleven immediate steps to be
taken, and further cooperative studies
or efforts on three more phases of
the problem.

The first group, for immediate
action, was as follows:

(1) Adoption of auxiliary means of
navigation by all air lines. This
only for violating the radio compass
or radio direction finder. It is im-
permissible to the radio beam.

(2) Installation of directional and
bearing devices on all air lines.

(3) More exacting navigational
training of air line pilots.

(4) More-detailed installation of an
air log on all air lines, to record
movements of the aircraft, such as
altitude.

(5) Installation of radio-traffic
duplicated loop antennas on all air-
craft.

(6) Premission of Approved Type
Certificates air-line radio equipment
installations.

(7) Installation of only continuous
waves on Federal airways.

(8) More detailed and accurate
radio maps issued by the Govern-
ment.

(9) Pilot training as Link trainer
by all air lines.



SHIELDED LOOP ANTENNA
developed by J. C. Franklin, TWA's Chief Communication Engineer, for
use with the Linker Company.

AVIATION
March, 1937
48



THE S-43

SPREADS HER WINGS



Along the far-flung skyways of the
world, thousands of air travelers
are discovering the luxury of the
Sikorsky S-43. Holder of enviable
world's records, this high per-
formance amphibian has justified
its selection by transport opera-
tors in many parts of the globe.

**SIKORSKY
AIRCRAFT**
BRIDGEPORT, CONNECTICUT
Division of
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BALANCED

FOR TAKING OFF . . . FOR CLIMBING . . . FOR CRUISING

For maximum cruising range with a minimum of fuel load, instant response to the throttle on take-off, and for economy when "cruising" . . . your gas must be balanced!

For complete information on any of Shell's Shell Aviation Gasolines, with whose ratings from the standard 73 to the sensational new "100" are just such fuels! Shell is balanced gasoline . . . balanced for

quicker starting, more "revs" during the take-off and climb, and lower fuel consumption in flight.

For complete information on any of Shell's line of aircraft petroleum products, write to the Shell Aviation Department, Shell Building, San Francisco; or Shell Building, St. Louis; or 50 West 50th St., New York.



(10) Expedition of airport approach light installation by the Bureau of Air Commerce.

(11) Creation of an extended Safety Research and Development Section of the Bureau of Air Commerce. This section would include a committee representing the air lines and other interests involved which would advise the Department as to the subjects most urgently in need of investigation, experimentation and development.

The second group, for responsive study, included:

(1) Improved and more adequate airway aids and weather reporting systems.

(2) Maintaining ground and plane radio equipment.

(3) Federal ground direction finding for emergency use.

How much this program would cost caused some differences of opinion. The year's budget estimates provide \$5,000,000. Last August the Air Transport Association submitted to Commerce a "master list" of 200 items of improvement to Airways which would cost an estimated \$10,000,000. Edgar S. Gernert, president of the A. T. A., said that at "existing construction rates" the cost would now be \$14,000,000. The A. T. A. will press for appropriation of this amount.

Col. J. M. Johnson, Assistant Secretary of Commerce, doesn't want \$4,000,000. "We don't need it," he remarked. "I don't want any additional money. We've got enough now and if we can show that we can spend that efficiently, wisely and judiciously, we will get \$50,000,000 eventually."



TWA WILL FLY

Boeing like this in the spring of 1980, five of them, costing \$1,042,520 each, seating 32 by day and 40 at night, 4 at night, have been ordered. They will be powered with four 1,200 hp. Wright Cyclone G-119s.

More Big Planes

Business orders more Douglas. FAA service to China starts this month. Civil rules for Africa

THE THREE IF LARGER EQUIPMENT OR domestic loan continues. TWA has announced a Boeing order (see above), and Douglas reports 30 DC-3s and DC-7s on order. Several lines have reported substantial gains in 1976 volume of business

over 1975, with air express in particular showing sterling gains.

And while domestic lines are supplying equipment, and setting trouble-free records Pan American's Pacific Division suggests for the first step in its U.S.-China run, the 737-400, from Alaska to Moscow.

Latest domestic airline order of Douglas equipment is Eastern Air Lines, which has just put in a repeat order for five 21-passenger DC-3s, joining Eastern's total order to ten. The ships will be put into express service on the New York-Miami run.

Send General Manager E. V. Kido, publisher. "The remarkable public response to through service from New York to Houston, Texas, has indicated that we shall have to put 21-passenger ships at operation between these points in the very near future instead of the 14-passenger ships (DC-3s) now operated."

On to Hong Kong—through air mail service from San Francisco to China

* Domestic transport . . . Safety section in Washington holds a new program, alone recommended improvement . . . EAL's order for Douglas DC-3s being held until no domestic line to 31 . . . FAA will start flight-Mexico service this month . . . Air Express shows a 31 per cent gain for 1976.

* Airline . . . New York show produces \$1,000,000 of sales, a 22.5% gain. Will be second year.

* World flight . . . Austin flight to take for 1976 would be the world.

* Airline . . . second meeting between also included aviation.

* Airline . . . New York show produces \$1,000,000 of sales, a 22.5% gain. Will be second year.

* Industry . . . Passenger to be launched in England . . . Airline flight to be launched in England . . . Second study for production . . . Lockheed will be taken to South America.



In 1936 America's airlines carried the record total of more than one million passengers. An amazing growth—but it is paralleled by the equally amazing increase in the number of hours that airplane engines perform their vital duties without overhaul, and by the number of miles flown without engine failure.

We are proud of the part that Scintilla Aircraft Magneto has played in contributing to the increasing efficiency and reliability of the world's finest aircraft engines.

SCINTILLA

MAGNETO CO., INC.

(Subsidiary of Bendix Aviation Corporation)

SIDNEY, NEW YORK



Makes Also of Bendix Aircraft Spark Plugs



the show, as it was the first time in the East that planes were exhibited in a big way at a price range to attract any considerable number of possible buyers. Among this group were Taylor Cub, Aerona, Bonanza Arrow (powered with a converted Ford V-8 engine), Taylorcraft, Pietenfeld, and the Kinner Ace (also Ford V-8 powered).

The light plane people were unusually enthusiastic over results. J. C. Whitely, Aerona sales manager, said that "our last year's production figure of 265 planes will be increased to 700 units this year." Taylor Aircraft's secretary and treasurer, W. T. Payne, whose company produced 385 planes in 1936, predicted that "1937 production will be well over 1,000."

Engine displays ranged from single cylinder fractional horsepower units (for installation in model planes to the power Wright Cyclone delivering 1,230 hp. Also included in the General-Wright booth was the C-W completely controlled, constant speed, full-torque propeller (shown for the first time in Paris in November).

The military exhibit drew considerable interest. Included was the two-place Twin Wasp-powered Douglas D-46A (a patrol wing observation ship being supplied to National Guard units) and a Doerflinger aircraft (of which 27 are on order for the Air Corps) which was suspended from the ceiling, whole pointed up and covered, and cockpit cover twisted to prevent a look inside.

Many big names crowded in attendance along the extensive instrument displays of Bendix, Kalamazoo and Sperry, were introduced over the advances in structural design which permitted Douglas to place the more than 100 lb. metal which is the fuselage of the Phantom as close to base as 9 in. main line.

Two unusual propellers—the Maryland-Cater, with its two blades attached tangent to the perimeter of the hub rather than to its ends, and a single-bladed propeller exhibited by Schemm Brothers—drew gaging crowds.

Another exhibit drawing much audience interest was the Link trainer—a device reproducing at the ground all the conditions to be met in actual blind flying. Capable of four deep twisting while keeping blind flying students oriented under the hand through the intricacies of flying the beam.



THE BUSINESS END of an airplane as exhibited at the show by General-Wright. Here is the Cyclone engine and the C-W controllable pitch propeller.

Earhart to Circle Globe—

To start this month, is her Wasp-powered Lockheed Electra, to fly 27,000 miles westward.

A LONG-HERALDED AND OFTEN DENIED story of a future around-the-world flight is being confirmed this month when Amelia Earhart announced that she would take her new Wasp-powered Lockheed Electra, which is known as the "flying laboratory," on such a flight.

Not content with the usual "round-the-world" flight which serves only to prove 15,000 miles, she will make of the equator, Miss Earhart will, starting this month, (1) make a more-than-complete circle, crossing the equator four times, covering approximately 27,000 miles; and (2) fly the course from east to west. Only other east-west circumnavigation

was the flight of Army Douglas in 1934—the first round-the-world flight in history.

The course has its start in Oakland, Cal., whence it will proceed to Honolulu. Next stop—1,800 miles—Hawaii Island, a very quick stop at the equator which is important because it is American-owned and useful as an airbase stop on a Hawaii-Australia air-race. Bureau of Air Commerce personnel have been building an airport there for the past eighteen months.

From Hawaii Miss Earhart will fly to Los Angeles, then to Darwin, Australia, northward across India and East Africa, over the Sahara, and to Dakar, French West Africa. Then there she will cross the South Atlantic to Natal, Brazil, then fly northward over the routes of Pan American Airways to the United States.

From Oakland to Sydney, Australia, she will be accompanied by Capt. Harry Manning, who left the United States Lines to go with her as navigator. For the rest of the way she will depend on maps, dead reckoning, and a Bendix radio compass.

Calendar

Mar. 20(12)—Twenty-fourth Annual General Meeting of the Board of Directors of the United States Lines, Inc., at New York City. The meeting will be held at the Waldorf-Astoria Hotel, New York City.

LIGHTER and STRONGER— FASTER and SAFER . . .



FLIGHTINGS "SEA BIRD" AIRPLANE
Design and fabric to fit the plane and the engine is the key to the success of the plane. The Sea Bird airplane is a perfect example of the use of stainless steel in aircraft construction. It is a perfect example of the use of stainless steel in aircraft construction. It is a perfect example of the use of stainless steel in aircraft construction.

thanks to U-S-S STAINLESS STEEL



This is the way you make the beautiful steel of the Sea Bird airplane stronger, faster and safer. The stainless steel of the Sea Bird airplane is a perfect example of the use of stainless steel in aircraft construction. It is a perfect example of the use of stainless steel in aircraft construction.



ITS U-S-S Stainless Steel that makes the Flightings "Sea Bird" amphibian lighter and at the same time stronger, faster and at the same time safer. The explanation lies in two simple facts . . .

Example: Since there can be no

loss of metal by corrosion, the designer is free to use thinner sections extending farther from their central axis . . . and these sections can be closed. Result: Lighter weight sections of tremendous strength.

Important, too, is the "Stainless" process of stainless steel construction. Folds, fastenings and wing structures are made virtually one strong homogeneous metal mass. And with no rivet heads to interrupt the stresses, skin fusion flows to a maximum.

Unquestionably, stainless steel is an ideal metal for airplane construction. To airplane designers and engineers, it offers exciting, challenging opportunities to build new planes lighter and stronger, faster and safer. For further information on the Sea Bird story, Flightings, Inc., Bristol, Pa., or the "Stainless" process, write E. G. Ball, Mfg. Co., Philadelphia, Pa., or the nearest and representative of U-S-S Stainless Steel, which the designer and operator in the aircraft industry offer.

U-S-S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, Chicago and New York
CARNegie-ILANCO STEEL CORPORATION, Pittsburgh and Chicago
NATIONAL TUBE COMPANY, Philadelphia



Canadian Steel Company, San Francisco, Seattle Coast Office - United States Steel Products Company, New York, Boston, Portland

UNITED STATES STEEL

Institute Meets—

to discuss progress. Millikan elected president.

FIFTH ANNUAL MEETING of the Institute of the Aeronautical Sciences, which opened the Pupin Physics Laboratory at Columbia University in New York City Jan. 29-30, contained some technical discussion sessions and eight-night speakers, drawn from the whole world of aviation, made three days. To find time for all the papers scheduled, sessions were finished up in the morning of the first two days, while discussion subjects being chosen for these simultaneous sessions.

On Jan. 29 a series of films showing the development of rocketry facilities at Goddard, Langley, Grumman and JPL were shown and described. More news from abroad was presented at the Institute's annual dinner, when travelers who had been abroad discussing aeronautical developments gave a few of their impressions. These included Arthur Suga who spoke on Russia, Clark B. Millikan, now Institute president, on Germany, T. P. Wright, France, Stephen J. Zand, Italy, and James W. Taylor, England.

Several interesting ideas cropped up in the food and of session. G. B. Knudsen reported work done by the Fuel Development Corp., an organization with the American Airways in the Western Division, on a compressed fuel known as "Avalon" composed of alcohol, aviation and other outcropping fuels. It is claimed to be a separate fuel tank in an airplane and automatically fed in several quantities into the carburetor. One of the primary objectives is to use alcohol. With Avalon, an 80 octane gas may be pushed up to octane ratings as high as 107 at 142 in of mercury in the manifold. This construction has been found to be an effective device. It is said to have no effect on the engine parts after its conversion in the manifold, and it is claimed that maintenance may be reduced because cylinder temperatures may consistently lower than with normal fuel. It is reported that normal fuels may be treated at a cost of approximately \$1 cent per gallon extra.

James Doolittle of Shell thought that this new combination would find a wide market in the next five years. He estimated that by that time standard manufacturers would have developed engines that would require high octane fuels at all times and

not merely for take-off and for emergency purposes. He thought that octane would result from cracking on 180 octane fuels.

Interesting in this connection was Major E. K. Adelman's paper on high-octane fuels. He pointed out that 180 octane gasoline is very costly to manufacture and so far is as limited as any. Chief notes with the Army Air Corps and American Airlines. He indicated that extensive experiments were being conducted by the SUCA and the Air Corps to determine its advantages.

Russia Will Buy—

abroad under plan to reconstruct aviation industry

THE PROBABLY IN EXCESS OF \$100 million of aviation equipment and manufacturing machinery to Russia will be included in a program which is currently devoted to the discussion of the technological reconstruction of Russia's aviation industry in the course of that year was held in Moscow. Five hundred leading scientists and engineers attended in response to the call of Maksimovich, Russia's newly appointed Minister of War Industry. The conference decided upon the selection of equipment necessary to carry out the reconstruction program.

It is understood that a large fund has been made available for purchase of equipment abroad. Each aviation plant, it was decided, must maintain a technical staff, whose sole duty will be to keep himself informed on the latest developments in the aviation industry abroad.

To Cut Mail Postage—

unless Congress passes \$2,000,000 delivery bill

NOTHING FRAGILE FOR AIR MAIL. CONGRESSMAN is a statement by Senator French, second assistant postmaster general, that by March 1, 1958, Congress passes a \$2,000,000 delivery or mail improvement, compensation for air mail service will have to be drastically cut. Although last spring's Congress appropriated \$12,000,000 for the fiscal year 1958, "service at the performance of contractors is the matter of cutting a gross number of subsidies to this service," an inefficient appropriation to cover the services in

Traffic

Latest available statistics from the Bureau of Air Commerce and the Post Office Department—Domestic flights only



which is the rate of service passenger miles in January 1957 as compared with the corresponding figure for January 1956.

For December 1956 the indicator stood at 121.

AIR TRANSPORT INDICATOR

Feb. 1, 1957

110



LEADER OF MEN

—Lt. Col. William H. McDaniel, who commanded the Navy's most difficult flight in Hawaii.

effect at the time the act was passed, increases in pay rates allowed by the I.C.C., and the tremendous increase in the volume of air mail, resulting in the payment of extra rates on several contracts, has caused the airlines to defer action.

A few days after Branch's statement, his daughter, air mail contractor, filed a brief through the Air Transport Association with the I.C.C., asking a reconsideration of drastic changes in the present air mail law. Principal points in the present law that are criticized are the limitation of 40 cents a mile, irrespective of the amount of mail

carried, and the provision that on and after July 1, 1938, mail pay be kept within the limits of the designated postal revenue therefrom.

Navy Group Spans— Pacific to Hawaii in "weather transfer", 25 hours elapsed time

IN A "WEATHER TRANSFER" BY AGGRESSION, twelve of the Navy's best aviators, Consolidated patrol boats (PBY-1) took off from the harbor at San Diego on Jan. 28 for a formation flight in Hawaii. Under command of Lieut. Comm. William H. McDaniel, the planes met at rendezvous, 16,000 ft. above Point Loma, and headed for their goal at the naval air station near Honolulu, 2,555 miles across the open sea.

Three hundred miles out of Honolulu, the flight cut into a severe pressure storm, which got so bad that the squadron was ordered into three-plane groups, the planes in each group flying within 25 ft. of each other in order to maintain contact. The wind was so strong that at one point, according to McDaniel, "it momentarily stopped us cold." But otherwise the flight was uneventful, and the twelve planes landed on the smooth waters of Pearl Harbor under the glare of searchlights at 3:30 a.m.—21 hours 43 minutes from the take-off. The flight received positive and progress reports along the route from five navy ships detailed for that task.

Air Corps Plays War— under winter conditions at Selfridge Field, Mich.

THE SCENE OF THE COMBAT HEADQUARTERS AIR FORCE ANNUAL WINTER MANEUVERS was shifted this year from New England to Selfridge Field, Mich. The participating units, which came from Barksdale Field in Louisiana and Mitchell Field on Long Island in addition to the Selfridge Field contingent, were organized in a "prewarred cold weather support unit group." The prewarred unit group was commanded by Col. Walter H. Frank, commanding officer of Mitchell Field. The tests were run under the direction of Brig. Gen. Henry C. Pratt, commanding the second wing of the O.H.G. Air Force at Langley Field, Va.

The purpose of the maneuvers was not only to test the performance of pursuit, attack and bombardment units, but also to determine the efficiency of ground and flying personnel under severe conditions and to test new flying clothing, instruments, and maintenance equipment. All personnel and supplies for the test were transported by air in nine 36-passenger Douglas transports and two Lockheed Electras. Participating personnel included over 300 enlisted men and 100 officers. Manoeuvres were scheduled to last from Feb. 1 to Feb. 28. Observers the next were officers and civilian engineers from the Technical Division of the air force at Wright Field, Dayton, Ohio.

**The Skyways are
Western Electric Voiceways**

MAJOR airlines—flying more than 30 million miles a year—use Western Electric Radio Telephone equipment.

The majority of the private planes using radio in this country are Western Electric equipped.

In fact, wherever and whenever planes fly . . . in most instances, you'll find that it's Western Electric Radio Telephone that provides the necessary com-

munications link between planes and the ground.

Made by the makers of the nation's telephones, Western Electric radio is designed especially to meet the conditions peculiar to aviation service. Dependability and simplicity of operation are its outstanding characteristics.

For full details, write to Western Electric Company, Dept. 307 A, 195 Broadway, New York, N. Y.

Western Electric

Western Electric
in Canada

TWO-WAY AVIATION RADIO TELEPHONE AND TELEGRAPH EQUIPMENT



OCEAN SPANNER

One of the twelve Consolidated patrol flying boats which flew its route from San Diego to Hawaii about to enter the water. The flight, a "weather transfer" of Navy material, was made in 21 hours 43 minutes.



1937 STINSON 'RELIANT'

Acclaimed by Engineers Everywhere

Our School of Aeronautical Engineers continues to attempt to revolutionize the airplane, just as our School of Automotive Engineers continues to try to change the type of automobile now in common use. It would be a calamity if this type of THINKING stopped, as tremendous good comes of it.

Another School of Engineers is concerned with improving the type of airplane or automobile we now use, and it is to this School that Stinson Engineers belong.

Since the inception of its HIGH winged monoplane with wide conventionalism in 1925, Stinson has STUCK TO ITS TYPE and gradually forged to the front by adding first one and then another worthwhile improvement.

This policy has won allegiance for Stinson from the

largest group of other plane flyers in the Nation. Engineers acclaim the 1937 'Reliant' even if they quarrel with its TYPE because in its design they read those qualities which make for safety, utility and longevity, and this will always be the goal of the Engineer regardless of the route he chooses to take to attain it.

More Engineers would recommend a Stinson 'Reliant' than comparative examination does any other make, because there would recognize the proved goodness beneath the outward gloss, especially when a visit to our Factory.

If you have not received a copy of Stinson Plane News, we will be glad to send it for the asking, or the Stinson Distributor in your section will be glad to supply Plane News and a flight, if you choose, as he likely now has his 1937 Model.

STINSON AIRCRAFT CORPORATION

DIVISION AVIATION MANUFACTURING CORPORATION

WAYNE (Detroit Suburb)

MICHIGAN

U. S. A.

Schools, Services, and Airports

Here and there across the country's flying fields

Schools

**Enrollment up, classrooms high
for Casey Jones, Boeing**

SOME YEARLINGS and year-beginning reports from the country's air schools indicate capacity and over-capacity conditions. Also evident is high availability of graduates for positions with the airlines and manufacturers.

Casey Jones, president of the CASEY JONES SCHOOL OF AVIATION, INC., Newark, N. J., in his annual report issued during 1936 sets in terms of 400 students, the capacity of the school. The School offers two curriculum lengths: master mechanic course which results in a Department of Commerce Airplane and Engine license and a two year course in mechanics and aeronautical engineering.

The school placed 136 graduates in aircraft factories and with airlines during 1936. Volume of enrollments represented addition of four new instructors during the year, bringing the total up to 78.

The Graduate Aircraft Engineering Corporation has recently given employment to twelve graduates of ROOSEVELT AVIATION SCHOOL, Roosevelt Field, Mass., U. S.

Thirty-one new students registered at PATTER AIR COLLEGE, near St. Louis, Mo., for the fall two year course at the mid-month term, beginning Jan. 4. A total of 248 students are enrolled, on lecture, engineering, 60, aviation operations and executive, 15, practical flight, 30, master mechanics, 105, and special 18.

In December 23 students were graduated from the TORRES SCHOOL OF AVIATION, Oakland, Cal. Certification of graduation were presented by A. P. Bonaldi, Director of Technical Instruction at the Boeing School.

During 1936 112 Boeing School graduates found employment with air transport and aircraft manufacturers.

ing organizations. This exceeds the number graduated during the year. The WEST VIRGINIA STATEMAN PLANE ASSOCIATION is sponsoring a grand school at Charleston, West Virginia to be held once a week until June 1, with Dallas Tex. as destination.

MARSHALL BUTTS SCHOOL, Inc., operating at Millisley Airport, Canton, O., related more than 40 students in Taylor Cole during 1936. Marshall and chief instructor at the school is Earl G. Kral.

State Control

**Four States planning aviation
committees. New rules in
Massachusetts.**

Following the example set by such states as Michigan, Connecticut, Pennsylvania and Nebraska, four more States are planning establishment of aviation committees for

the regulation and supervision of domestic flying.

In Tennessee a plan for the creation of a State aviation division is being considered. The proposed division would support the present aeronautics commission, and would be formed by absorbing of the seven state aviation divisions into aviation division from highway laws. Most voters of it a candidate for the post of director of the division is George Hardin, for several years with the State aviation department.

Two other States considering establishment of aviation committees are Wyoming and New York. The Wyoming plan, sponsored by the National Association of State Aviation Officials, calls for a three man commission appointed by the governor. Committees would serve without compensation.

The New York plan, as introduced in the State senate by A. Spencer Field, provides for committees, three of whom shall be actively en-



MODEL MERIT

is awarded at the Philadelphia Aircraft Show on Jan. 5. Shown presents the trophy to Harry Kuhn.

people in the aviation industry. These commissions would serve without pay. In addition, the bill provides for a director of aeronautics, at a \$7,500 yearly salary. He would be the executive officer of the commission.

A bill designed to relieve airplane accidents and providing for the appointment of a State Air Commission of their terms has been introduced in the Missouri legislature by Rep. Will L. Lindbergh. The bill makes it a misdemeanor for an unfurnished pilot to fly an airplane, and for anyone to sell a plane to an unfurnished pilot or cause an unfurnished pilot to give possession of a plane to take into the air.

The Massachusetts State Department of Public Welfare has approved a new set of rules and regulations governing the operation of aircraft in the State. The proposed change requires the approval of the registrar of Motor Vehicles, as all previously-authorized vehicles and licenses derive from airports in the State. The rules were effective after Jan. 30, 1937.

Oregon State Senators are seeking an appropriation for the purchase of a State-owned airplane, for use as a prototype forest ranger, transporting food and medicine to emergencies, and for the use of the State inspector of communities.

Flying Services

Shuman sales. Wiggins takes over assets of Shale Airlines

A GENERAL INCREASE in flying activity is shown in reports of sales by airlines distributors, with considerable selling help expected from the National Aviation Show in New York. Several fuel-tank operators are increasing their facilities and expanding their activities to take care of the jump in business.

LEACH AIRCRAFT, Inc., Shuman distributors having at Roosevelt Field, Mineola, N. Y. four demonstration models of the 1937 Stearman biplanes on display. Spencer Leach, president, reports that many prospective purchasers have been given demonstrations. Leach also had a Robert at the New York Show, where several sales resulted.

Harriet Bender, owner of the Buckley Air Transport Company, has leased the Scott Airport at Columbia, Va. She plans to erect a \$50,000 hangar and will conduct

a flying school and charter service from the field. At present, it has a Standard and a Curtiss biplane.

The municipal airport at Danville, Va., has been leased for two years to KENNEDY AIRWAYS, Inc., Danville, Va. Monthly rental is \$15. The company has agreed to provide one of the field by a scheduled air transport line should Danville become a regular airline stop.

Bob Kokoma, manager of the Southern Airways Airport, Toledo, O., is fielding the busiest year at the field thus far took over the management in 1935.

A new local service said to be available at Sacramento, Calif., will be an airplane and engine repair service under the direction of WILLIAM SULLIVAN. The business, in which Martin Duggert is also interested, will be conducted in a new hangar near center town.

Members of the Sacramento, Cal. chapter of the National Aeronautic Association, have elected EUGENE BLUMENBAUM as president for 1937. His successor J. Frank Elmer, from Whitney, head of the Whitney Flying School, was elected vice-president. Dale Elmer, secretary, and Boyd Collier, treasurer.

Shale Airlines, operated by the late John H. Shale, at East Boston (Mass.) Airport, has been taken over by E. W. Wiggins AIRWAYS, Inc. Main Wiggins base is at Providence, R. I., with another at the Naval Station, Metropolitan Airport, Norwood, Mass. The three units will continue, as in the past, to give student instruction and provide charter service. The Shale equipment consisted of half a dozen planes and a hangar leased from American Airlines at East Boston Airport.

RAFF CRAFT AIRWAYS, Hingham, Mass., has purchased a new Taylor Cub through E. W. Wiggins Airways.

AIRWAYS, Inc., of Waterville, Me., Taylor Aircraft Company distributor for Maine, New Hampshire and Vermont, sold 24 planes during 1936. Wesley H. Marlow, president of the company, reported that as the firm would before the middle of January fifteen Cubs were delivered.

The MONTGOMERY (Ala.) SCHOOL OF AERONAUTICS has reported sale of 33 planes during 1936. According to L. G. Moore, president of the school, this sales record is the combined sales of the preceding three years.

Airports

WPA sponsors improvements. American leases Buffalo field

Extensive WPA projects for construction of new fields and development of old ones continue to provide new opportunities for the kindhearted operators, while established fields are reporting new highs in traffic for 1936. The total allocated by the WPA for airport work is nearly \$60,000,000.

Applications for the grant or loan of \$200,000 of Federal funds for improvements to Los Angeles Municipal Airport is being received by the Los Angeles City Council on request of Col. Richard Doolittle, city director of airports. Plans call for improvements to the runway system, and provision of landing lights, radio beacon, hangars, waiting rooms and other facilities.

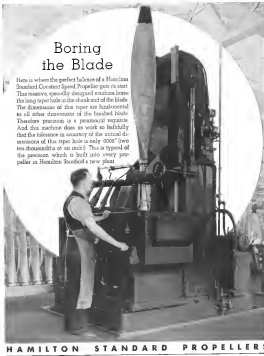
M. L. Williams, manager of Love Field, the DALLAS, Tex., municipal airport, has reported substantial traffic gains at the field for 1936 over 1935. Last year 20,545 passengers arrived at the field on scheduled air lines, and 28,592 departed. For 1936, the figures were 24,968 and 24,537 respectively.

The \$40,000 WPA project for the improvement of Lovell Field, CHARLOTTE, Tenn., was completed in January, and the field reopened. Another \$125,000 in WPA funds will provide for extension of the earth-and-asphalt runway from 3,000 ft. to 4,500 ft.

Grass marker lights are being installed by the WPA at the ends of the runways at the CHARLOTTE, S. C., Municipal Airport. Work at the west end of the 4,000 ft. runway was also being removed.

A long-standing controversy over American Airlines' lease of facilities at the Buffalo Municipal Airport was settled in January when the airport committee of the Common Council agreed to a two-year lease at a total rental of \$150,000. The agreement was still subject to approval by the whole Council and the Mayor. The settlement of the lease will expedite completion of the \$1,304,000 WPA airport improvement project at Buffalo.

The Bureau of Air Commerce is installing runway approach lights at LAWRENCEVILLE, Ga. Municipal Airport. Powerline cross lights will be placed 30 ft. apart in a line running north-south from the airport.



HAMILTON STANDARD PROPELLERS
DIVISION OF UNITED AIRCRAFT CORPORATION • EAST HARTFORD, CONN.

NOTHING LIKE CONCRETE

TO HELP YOU LAND SAFELY



Wichita-Chase Airport, Minneapolis, showing plan of concrete runway. Runway 100 ft wide and 1,000 ft long, with 10 ft wide and 1,000 ft long, with 10 ft wide and 1,000 ft long, with 10 ft wide and 1,000 ft long.

MINNEAPOLIS has just reinforced its World-Champion Airport, to mark the completion of new concrete runways which make this airport one of the country's best—and safest!

Plots can see light-colored concrete runways better, night or day. Concrete provides a smooth, dependable surface to land on, with ample margin for fire—no excessive crown, no potholes of standing water, no ruts or bumps, no loose particles to endanger propeller, passenger or plane.

Concrete's cleanliness and safety invite patronage—put your airport on a 365-days-a-year basis.

With all its advantages, concrete is moderate in first cost and actually costs less over a period of years. Runways can be designed economically for given wheel loads and landing impacts. The simple safety factor and durability mean long service life with extremely low maintenance expense. Its light gray areas surface permits adequate lighting at lowest cost.

Specify concrete for your runways and aprons. Learn about International Concrete and the booklet, "Concrete Makes Modern Airports."

PORTLAND CEMENT ASSOCIATION

Dept. 3-41, 22 West Grand Avenue, Chicago, Illinois

Aviation People

Who's who and what they are doing

At the winter meeting of the Air Transport Association, held in Daytona, Oliver West was elected chairman of the Inter-Airline Maintenance Committee. A graduate of the Boeing school, West joined United Air Lines in 1929, for the past several years has been superintendent of engineering. He succeeds Wallace A. Hawthorn of TWA, last year's chairman and holder of Aviation's annual Maintenance Award.

Penn. continues the selection by the American section of the Ligue Internationale des Aviateurs of Harry A. Bacon, American R. E. Ryan, Chairman; Parker M. Brown, Col. Harold E. Hartwig, Capt. Gary Jones, Maj. Clayton Kewler, Capt. Edith Rockenfeller, and Chairman J. B. Taylor. Election is present holder of three speed records.

At the annual meeting of the International Chamber of Commerce of America, the following companies took place: International Chamber of Commerce, Inc. (President, Vice-President, L. D. Bell, Bell Aircraft Corp., East-Schaefer, Stinson Aircraft Co., C. E. Parker, Washington, D. C., Secretary, Robert Green, Lockheed Aircraft Corp., Treasurer, C. P. Barker, Aviation Manufacturing Corp., Assistant Treasurer, F. J. Walke, Phoenix, N. J. Board of Governors: James Murray, G. W. Vachon, S. M. Patterson, General Motors, G. S. Wrenn, H. D. DeWitt, D. L. Emery, C. J. Bennett, M. B. Gordon, Charles Barker, E. D. O'Connor, C. L. Lawrence, T. A. Morgan, Oliver Parke, James

Guthrie, R. E. Adams, R. J. Tetterton, Morgan, R. M. Crumrine, C. E. Wilson, W. A. Thomas, Walter Breen, G. H. Bellamy, Wallace Kallert, Raymond Wilson, S. J. Bunker, and those of the officers, Messrs. Brown, Bell and Barker.

SEIDMAN M. FARMER, founder and most president of Fairchild Aviation Corporation, has been elected Chairman of its Board of Directors. James S. O'Connor, and now vice-president and general manager of the corporation, succeeds him as president. Mr. Fairchild remains the president of Fairchild Engine & Aircraft Corporation, holding company for Fairchild Aircraft Corporation. Col. John D. Jacoby is president of the latter division.

The varied and colorful career of William F. Anderson, pioneer flier, was ended by death caused by coronary thrombosis at New York City on Jan. 24. Mr. Anderson landed in the United States in 1911, becoming one of the first licensed airplane pilots in the United States. In 1912 he introduced the first American hydroplane into Japan. For his successful demonstrations and for his inauguration of air mail service in Japan, he received the Order of the Rising Sun. During the War he served in France and was later in command of the Naval Air Station at Duxford, Italy. For several years he has written and is a full partner for the American Aviation Association.

Edith Gardiner Corporation's new vice-president, J. Grant Taylor, joined the organization in 1925 as Canadian representative, succeeded Archibald H. Macleod in general sales manager in 1928. He will continue as head of the Edith sales division.

Publicity from the Washington Institute of Technology is in the



OLIVER WEST



SEIDMAN M. FARMER



WILLIAM F. ANDERSON



J. GRANT TAYLOR

hands of CHARLES R. FLAHER, lately in charge of the west department for Security Aircraft Corporation.

The program to develop air-mindedness in women is strengthened by the appointment of HELEN TRANSMORE as director of the

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"Like a Kitten"

(Continued from page 62)

variation along the tube wall is 4 ft. We can do this by placing the forward tubes well 79 ft. from the plant of the propeller. If it is placed closer than this the amount of variation in noise level in the cabin will be the difference between the levels at the forward wall and at the 79 ft. position.

Uniformity of noise level in the main cabin of the DC-2 was secured by placing the forward wall 50 ft. behind the plant of the propellers. Measurement of the noise distribution then showed a maximum variation of three decibels between all seat positions under cruising conditions as shown in Fig. 2. The variation in the DC-2 cabin was less than 2 decibels under certain operating conditions and was probably due to interference effects.

THE VIBRATION SYSTEM is unique in that both engine and rotor air is isolated through long ducts with isolation mass filters. By allowing the fabric lining in the cabin to serve as one boundary, the outlet duct was made with less weight than would be used in the required number of single air duct outlet vents. The fabric boundary was treated in such a way as to provide high sound absorption, and the result, ducts were lined with a low frequency type of filter. During tests, there was no increase in noise level as the microphone was moved toward any of the vibration openings.

The level in the "city-room" is higher than that of the main cabin, although lower than any portion of the DC-2 cabin. The same procedure was followed in determining sound level in the city-room as for the main cabin, but unfortunately was disturbed more by the more rapid variation of noise level in the propeller. Test results on the city-room under specified conditions are given in Fig. 2.

The "house line", or location commonly at Fig. 2, is very useful in checking noise "flow" and distribution. The conditions under which these were determined are for normal cruising at 1800 ft. at 1800 r.p.m., but since they are difficult for the various operators, the average noise level and the contour pattern in all the ships will not be the same as

actual operation. The noise level changes very little with variation in any operating condition other than power and propeller tip speed, but the effects of changes in such of these are known and may be added to obtain the actual change.

In Fig. 2 the variation of average noise level with power and with r.p.m. is given with respect to the conditions of Fig. 2. (To compare with any similar reference level, subtract 13.0 db.) The average noise level in the main cabin determined from the curves for 1800 r.p.m. and 65% hp, for example, will be 79 plus 2 plus 2 = 83 db.

Provided power and tip speed was kept constant, moderate altitude was found to have little or no effect on noise level. Measurements made at different times with dynamic, crystal, and ribbon velocity microphones showed less than 1 db difference between any level and 15,000 ft. The curve published by Gov. Nelson in the noise-altitude characteristic for the DC-2 shows very clearly the performance curve for this airplane when the correction of Fig. 3 are applied.

As a result of careful engineering during the development of the DC-2, and of its similarity to the DC-2, the engine speed treatment was found to be quite satisfactory and no change was made on subsequent airplanes. This resulted, of course,



Fig. 2 Variation of average cabin noise level with power and propeller tip speed (13.0 db. at 1800 r.p.m. noise level db.)

by a considerable saving in test flight time as well as in ship research. Quality of the sound is determined by the various frequency components present was judged by a varied group to be suitable for a stereo, and while the ear is the most reliable quality sensor, complete frequency analysis was made throughout the airplane for record and comparison. Three of these are shown in Fig. 4, one at take-off, one at the forward end of the DC-2 cabin, one at the nearest point in the DC-2 deplane, and one at the quietest point in the main cabin.

Acoustic laboratory measurement of the position value of various combinations of materials made it possible to keep the weight of soundproofing to a minimum. Since the number of passengers with the DC-2 may carry more with different operating conditions from 14 to 38, (Two in part 70)

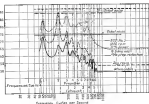


Fig. 4 Frequency analysis weighted in curve 2 reference level—ASA STD.

AVIATION
March, 1957

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Seaplane Handling

(Continued from page 52)

will be blown directly into the wind or directly down wind. If there are side-caps or spars, the direction of the wind may be indicated by watching them, as the spray adheres to some angle to the wind. If there are no side-caps, the only action is to fly close to the water at low speed and determine the drift of the ship.

CRUISING

A mail outfit for equipment will pay large dividends in the way of convenience and often freedom from minor dangers. An anchor worth about a hundred feet of $\frac{1}{2}$ in line is essential. A heaving line, fifty feet long and $\frac{1}{4}$ in. or $\frac{1}{2}$ in. in diameter is also necessary, but only for throwing to a dock but not for tying down the ship if it is left out over night. Several short pieces of light rope eight or ten feet long are useful in securing to a float or dock. An especially useful device is a canvas pulley with a handle end. This will be found most convenient in picking up moorings or in pulling away from a dock when there is no wind. The equipment specified for seaplanes by the Dept. of Commerce should, of course, be on board. A pair of cork fenders such as used by motor boats are handy when tying up to a dock not provided with protection of some sort. A lead roller should be attached to the bottom end of these fenders to keep them from flapping on the water. They should be hung on the front and rear foot struts between the float and the dock. A small vee pump is another handy item of equipment, especially if the ship is to be left in the water for long periods.

NEAR MOORING AND HANDLING

If the ship is to be left out over night, a large mooring is much safer than an anchor as the latter may drag if a wind comes up during the night. In mooring, a line should be fastened to the front strut or spreader, then secured to the mooring clew. Before in whatever the ship is being fastened to, then back to the other float, where it is attached in the same manner to the first, forming a bridle. The slack or wheel should be laid

at the bow ahead as this tends to keep the ship from bouncing into the air in a strong wind. A float may be used for holding the ship by running lines from bow and stern clews and making sure that there are fenders of some sort between the position and the float. A dock is not a satisfactory anchorage if there is any tide. However, if there are two docks or piers close together the ship may be tied between them with lines to each, leaving slack enough to take care of the tide. This anchor is excellent arrangement as the ship is sheltered on three sides. A beach may be used if the ship is beached at high tide and thoroughly lashed down at wing tips, tail and nose to allow drift with tide into the ground. In an emergency the floats may be filled with water after the beaching is accomplished.

For handling on the ramp or in the harbor most floats are equipped with tubes running through the floats

at the balancing point. The ship may be rolled down into the stern of the float, an axle passed through the axle and a wheel put on each end of each float, but wheels in all. This is the handling gear referred to above. Some ships, particularly the larger ones, are equipped with a special handling gear which may be attached in the water and used to tow on. If no gear or wheels are available, the ship may be rolled back on the stern and pushed, 1 in. a ft. or so and as far as the fore section of the float, laid under the keel to the cap and tied securely in the morning start at the bow. The place ship that be dragged around with a winch.

With some attention to the suggestions outlined in this article any pilot should be able to transfer from land to seaplanes with little difficulty, and once the transfer is made, once the landing is being able to think can't move at forced landings has been experienced, more there has been the thrill of alighting a few feet from the water with perfect safety, there are few who will care to go back to wheels.

"Like a Kitten"

(Continued from page 65)

we may best compare the weight of the accidental mortal installation with that of the DC-3 by expressing it as a percentage of gross weight, since the general proportions of the two airplanes are the same:

Weight of equipment	Gross weight	Percent gross weight
DC-3 (loaded)	29,000	14.88%
DC-3 (empty)	17,000	6.03%
DC-3 (empty)	20,000	6.03%

The above weights include all materials used in the passenger and pilot compartments for the purpose of securing the normal level. Recent investigations reveal that most of the new DC-4 indicates that the efficiency of future structural installations may be 20 per cent greater than even that of the DC-3. The moment came when we were trusting the DC-3 to guard against moisture absorption in the structural materials and to provide the best possible best fuselage. Both structure possible weight reduction

By coordinating the structural treatment of the DC-3 with ship practice, not all installation has been further reduced. Time required for complete installation in the DC-3 is less than for the standard DC-3 in spite of the greater amount of structural work.

References

1. For standards and requirements of aircraft structures: a. *AC 43-10*, *Requirements of Aircraft Airframes and Fittings*, by C. E. Jones, D. F. Lane and K. W. Temple. ASME Transactions for August, 1936.
2. For general principles of aircraft construction: a. *Aviation and the Airplane*, by Dr. S. J. Zand, *SAE Journal*, February 1955.
3. For general requirements of structural treatment for aircraft: a. *Development of Aircraft Structural Concepts*, by H. L. Voss, *Journal of the American Society of Aeronautics*, January 1952.
4. Details of the typical method used in the design, testing of the structure and of performance will be described in a future paper.
5. *American Tradebook Standards for Naval Level Motors* (SAS-1755).



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(Continued from page 73)

years or more without a single passenger fatality. During the same period they accumulated a total of more than 250,000,000 passenger-miles.

Although statistics on foreign operations are difficult to obtain, all evidence points to the fact that our own airlines use many times more than any other air transport operation in the world. It is a curious fact, however, that many people still are under the impression that air transport in Europe is ahead of ours in the United States. This is definitely far from the case.

Except for operations that are now using American-built airplanes, the foreign equipment in use in Europe today is either obsolete, or suffers from too close resemblance to military types. Imperial Airways, of course, re-equipping most of its fleet (see *Aviation*, February 1937). Its Empire type line is up-to-date in every respect and a great deal is expected from the Armstrong-Whitworth Empire class (a four-engine aircraft seating 42 passengers). But to date none of the Empires have been delivered, and the European services are still being flown with the ancient but invincible, Hercules and Hermes.

Good for 180 m.p.h., say they (if the wind doesn't blow too hard). Flies at 10,000 ft. It is to be seen all over Europe and the French transients such as the Piles and the Wibbeys certainly do not come up to modern American standards. Luftlinies still operates most of its current services with the Junkers 52s, slow, ugly and unsuited for comparison with our Rodges and Doughties. Here and there, however, modern types do appear. In Europe—namely, the Heinkel 111 and the Junkers 86, the latter powered with diesel engines. They are fast, but too noisy and lack the headroom and passenger space which we consider necessary.

Our own operating procedures we far surpassed in measures that when passenger safety. Our pilots do not take chances with their equipment, nor do they operate on the basis of giving the customers a thrill as they seem to do overseas. We use side-loads from certain overseas lines that under our care stand on end. It is one thing to take an

over-powered parent ship off the ground and put it into a steep climb; here, your mother is to do it with a two-engine transport loaded with passengers. Further, we did not care at all for the usual way in which many foreign airline pilots handle their matters just before take-off. After reviewing (and taking part in) a number of operations from European aerodromes, we came to the conclusion that pilots either (a) have underestimated the ability of their equipment to take hold instantly and to deliver full power at full throttle 100 per cent of the time, or (b) like the old duck's mate, "They just don't give a damn." We are sure that our own procedure of full-throttle engine run-up before each take-off is an important safety factor. Only two examples, but they illustrate a basic difference in operating technique that is very much in our favor.

We visited a number of maintenance shops in Europe and, perhaps with one exception, found nothing that could compare with our great overhaul bases at Chicago, Chicago, Kansas City or Miami. We had little opportunity to size up the quality of the work done, but certainly the conditions in the shops were not up to standards set by our major lines.

A great deal of talk has been occasionally about the superiority of European rules for communications and air navigation. No space here to go into the technical questions involved, but, even on one observation we know that European airlines have their troubles also. A brief mention shows that the system commonly employed in Europe of giving pilots "base" from two or three ground stations would simply break down in America where our airways are crowded with traffic. In the recent military conference in Washington in early February it was agreed among all operators that the radio range beacon system is what will be for a long time the backbone of our airway network. It is soon to be supplemented by radio directional finding apparatus (radio compasses) operated from the ships themselves rather than from the ground—an additional safety factor of great importance.

Railroading bookings are being made regularly at several points in Europe today whereas here in the United States we are still not yet certain that it is entirely safe to leave passengers in long freight cars, open by radio alone. We are having up our old gasoline rapidly, however, and at present three or four systems (including the European) are being studied carefully and the best of each being developed. Before long it will be possible to come in and out of busy airports as safely as one can load in the open. In the meantime, until we are perfectly sure of these things, regulations will cancel out flights that cannot be completely, or will divert traffic from a large airport to an alternate field that remains open.

Every year similar operations are finding new and better ways to provide the speed, the comfort and the safety that the public is demanding. With the full cooperation of government, of operators, and of manufacturers, every year brings us toward new highs in transportation safety. America should be proud, for beyond all questions, in air transport, we are leading the way.

1,000,000 Passengers

(Continued from page 73)

of aviation problems in New York. She started in the Bureau of Aeronautics, then, room in 1918 under the late Admiral Moffett and went with the Aviation Corporation in 1925.

There are many other familiar figures along the way. Counting to mind inventions are Radio Chief J. Edgar Hoover, Dr. Frank B. Rowland, Walter Dill, Treasury Watchdog Thomas Dunning, and deep voiced Max Baer who runs the New York State Athletic Association in his spare time. A. J. Giesche, who directs the New York sales district, has been accused of trying to solve the aviation unemployment problem. In fact, that there were the New York office has grown from 10 to 30 employees.

Almost every one of the 1,900 people who work day and night to keep American Airlines running has some special qualification. It is to this group of pioneers and their able leaders we extend our best wishes as they embark on the major project of carrying the second million passengers.

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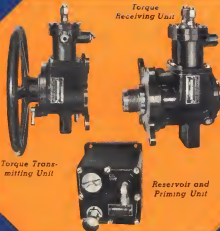
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